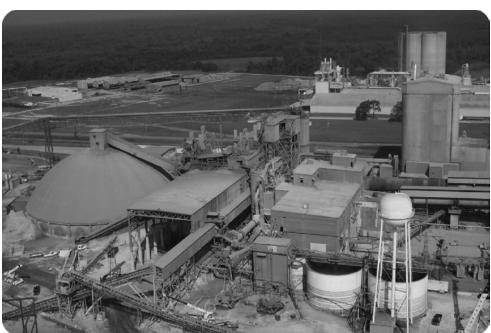


PowerFlex 6000 Medium Voltage Variable Frequency Drive Shipping, Handling, and Installation Manual

Publication 6000-IN006B-EN-P











Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

Reproduction of the contents of this manual, in whole or in part, without written permission of Rockwell Automation, Inc., is prohibited.

Throughout this manual, when necessary, we use notes to make you aware of safety considerations.



WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.



ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.

IMPORTANT

Identifies information that is critical for successful application and understanding of the product.

Labels may also be on or inside the equipment to provide specific precautions.



SHOCK HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.



BURN HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.



ARC FLASH HAZARD: Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE).

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Notes:

Introduction

This document provides procedural information for physically unloading, moving, and installing PowerFlex® 6000 medium voltage drives.

Who Should Use This Manual

This manual is intended for use by professional riggers, general contractors, electrical contractors, or plant operations personnel familiar with moving and siting heavy equipment. Specific experience with solid-state variable speed drive equipment is NOT required for this part of the installation process, but is mandatory for subsequent processes.

What Is Not in this Manual

This manual provides information specific for physically unloading and situating a PowerFlex 6000 drive. It does not include project-specific, or drive-specific topics such as:

- Dimensional Drawings and Electrical Drawings generated for each customer's order.
- Spare parts lists compiled for each customer's order.
- Drive-specific technical specifications.

Refer to the following documents for additional product detail or instruction relating to PowerFlex 6000 drives:

- PowerFlex 6000 Medium Voltage Variable Frequency Drive Commissioning Manual (6000-IN007_-EN-P): required procedures and checklists for Rockwell Automation Field Service Engineers.
- PowerFlex 6000 Medium Voltage Variable Frequency Drive User Manual (6000-UM001_-EN-P): instructions for daily recurring drive usage, HMI interface and maintenance tasks for the product's end-user.

Required Supplemental Information

This manual includes generic information about the drive cabinet layout orientation and generic electrical connection information.

Review the project-specific Dimensional Drawings (DDs) and Electrical Drawings (EDs) to better understand the specific drive system cabinet orientation and wiring requirements before performing any mechanical or electrical work. Paper copies of the DDs and EDs are placed in the document/hardware box in the Isolation Transformer Cabinet before shipment. Contact the local Rockwell Automation office to obtain digital copies, if required.

If the drive system is supplied with a bypass cabinet, important information is included in the user manual.

Bulletin 6012DB Medium Voltage Bypass Cabinet User Manual (6000-UM002_-EN-P): instructions to connect incoming line and outgoing motor power cables, interconnection of power cables and control wiring between bypass cabinet and drive, and instructions for daily recurring usage and maintenance tasks.

General Precautions



ATTENTION: This drive contains ESD (Electrostatic Discharge) sensitive parts and assemblies. Static control precautions are required when installing, testing, servicing or repairing this assembly. Component damage may result if ESD control procedures are not followed. If you are not familiar with static control procedures, reference Allen-Bradley publication 8000-4.5.2, "Guarding Against Electrostatic Damage" or any other applicable ESD protection handbook.



ATTENTION: An incorrectly applied or installed drive can result in component damage or a reduction in product life. Wiring or application errors, such as, undersizing the motor, incorrect or inadequate AC supply, or excessive ambient temperatures may result in malfunction of the system.



ATTENTION: Only personnel familiar with the PowerFlex 6000 Adjustable Speed Drive (ASD) and associated machinery should plan or implement the installation, start-up and subsequent maintenance of the system. Failure to comply may result in personal injury and/or equipment damage.

Commissioning Support

After installation, Rockwell Automation is responsible for commissioning activities for the PowerFlex 6000 product line. Contact your local Rockwell Automation sales representative to arrange commissioning.

Rockwell Automation support includes, but is not limited to:

- quoting and managing product on-site start-ups
- quoting and managing field modification projects
- quoting and managing product training at Rockwell Automation facilities and on-site

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, http://www.ab.com	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at http:/www.rockwellautomation.com/literature/. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

Contractor Scope of Work

Typical scope of work by the freight company, third-party contractor and/or customer (based on ex-works INCO terms)⁽¹⁾:

- Load equipment on truck at a Rockwell Automation manufacturing facility and transport equipment to site
- Offload equipment from truck on-site
- Perform initial inspection⁽²⁾
- Move equipment to the final installation location
- Position the cabinet sections together as shown in Dimensional Drawing and level the cabinet lineup
- Mechanically join cabinets together
- Affix the cabinets to the floor
- Install assemblies shipped loose (fan assemblies).
 For IEC only drawout power modules if applicable
- Install external ductwork to exhaust heated air from control room (if required)
- Install power and control cabling and terminate cable connections to drive system:
 - Connect system ground cable⁽³⁾
 - Megger test of incoming line and outgoing motor power cables
 - Connect incoming line and outgoing motor power cables⁽³⁾
 - Connect control power wiring
 - Connect all external customer required control signal wiring
 - Connect electrical safety interlock control signal wiring circuit to input circuit breaker
- Connecting the power cables and control wiring between cabinets that are shipped separately^{(4) (5)}
- Complete Pre-commissioning Checklist

⁽¹⁾ All or part of these activities could be provided by Rockwell Automation or its representatives, based on contract INCO terms and negotiated scope of supply/services agreement. Contact the local Rockwell Automation office for further information.

⁽²⁾ Customer should lead the initial inspection process.

⁽³⁾ If an optional bypass cabinet is supplied, the system ground cable, incoming line power cables, and outgoing motor power cables are connected to the bypass cabinet. Refer to 6012DB Medium Voltage Bypass Cabinet User Manual (6000-UM002_-EN-P).

⁽⁴⁾ Additional information about interconnecting the power cables and control wiring for a system including a bypass cabinet is included in the 6012DB Medium Voltage Bypass Cabinet User Manual (6000-UM002_-EN-P).

⁽⁵⁾ Interconnection of power cables and low voltage control wiring bundles, between separately shipped cabinets, can be done by the contractor or Rockwell Automation. The commissioning quote from Rockwell Automation reflects this and will contain two options:

a) the base quote, reflecting the power cable and control wiring interconnection work being done by the contractor
b) the optional quote adder, reflecting the additional time and cost for Rockwell Automation to perform the power cable and control wiring interconnection work immediately prior to the commissioning process.

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Shipping and Handling Procedures (For IEC)

This document pertains to PowerFlex 6000 medium voltage drives and also mentions the optional bypass cabinets. Additional procedures may apply for specific equipment. Refer to other documentation provided with the equipment.

IMPORTANT

Chapter 1 contains important information about offloading the drive crates and handling the drive cabinets. Review this chapter before attempting to offload the crates from the delivery truck and move the drive cabinets. The instructions help you safely offload and transport your Rockwell Automation Medium Voltage product to the installation site.



WARNING: Never attempt to lift or move the drive by any means other than the handling methods listed in this publication. Failure to do so may result in personal injury or death, damage to the drive, and potential economic loss.

Overview

The PowerFlex 6000 drive cabinets are bolted to wooden skids and placed into wooden shipping crates. After the crating is removed, the cabinets must remain bolted to the wooden skids until moved to its final installation area. Lifting angles are affixed to the shipping skid on either side of the cabinetry, where applicable. The cabinets must remain in an upright position during handling.



ATTENTION: The load carrying capacity of the lifting device and rigging must be sufficient to safely raise the drive. Check the shipping weights by referring to the container's commercial invoice.

Round rollers can be used to assist in moving the cabinets to the installation site. Once at the final site, the pipe rolling technique can be used to place the cabinet in the desired location.



WARNING: Exercise extreme caution when moving the drive to ensure the equipment is not scratched, dented or damaged in any manner. Stabilize the drive during handling to prevent tipping and injury to personnel.

Any error in transporting or installing the drive will delay the drive commissioning progress.

General Handling Information

- Rockwell Automation strongly recommends using professional riggers with suitable rated lifting equipment to move the drive to the final installation site.
- Qualified professionals must inspect all lifting equipment prior to moving the cabinets.
- Keep the cabinets in an upright position. Some units are top-heavy and may fall over if tilted.
- The cabinets are not rigid structures. Do not torque or twist the cabinets while siting the drives or joining the shipping splits.
- Use fasteners with a minimum metric Grade 10.9 (SAE Grade 8) strength.
 Rockwell Automation recommends using Crosby bolt-type shackles.
- All lifting cables must meet lifting capacity requirements.
- Close and secure all drive doors before moving the equipment.
- Keep the cabinets bolted to the wooden shipping skids to minimize the
 possibility of it tipping. Do not remove the wooden skid until the cabinets
 are at the final installation area. Depending on the type of drive cabinet,
 the crate may include a pair of lifting angles. Install both lifting angles on
 top of the cabinet.



ATTENTION: Do not stand near or underneath equipment being lifted overhead.



ATTENTION: Restrict access to areas where equipment will be lifted overhead to prevent access from unauthorized personnel.

Offloading and Moving Crates

Fork Lifts

The terms fork lift, lift truck, and fork lift truck are all commonly used and refer to the same thing. A single fork lift may be used for offloading and moving cabinets up to 4 m (157 in.) wide, if the fork lift has sufficient lifting capacity. Cabinets exceeding 4 m should be offloaded and moved with two fork lifts operating in tandem.

- Insert the forks into the openings of the wooden shipping skid.
- Balance the crates on the forks. The crates can be heavier on one side.
- Use safety straps when handling to steady the crate while moving.

Unpack and Inspect the Drive

Before leaving the factory, all drives have undergone both performance and quality tests. However, damage may occur during the shipping or handling process.

Immediately upon receiving the drive, inspect the crates for signs of damage. After the crates are offloaded, disassemble the crating and check for possible shipping damage. Use a crowbar or other suitable tool to carefully remove the packaging. Do not insert the tool too far into the packaging or damage to the drive cabinet may occur. Inspect the drive cabinets for physical damage according to the Rockwell Automation Conditions of Sale. Open the doors and inspect the major components for signs of damage (Table 2).

Figure 1 - Crated Cabinet

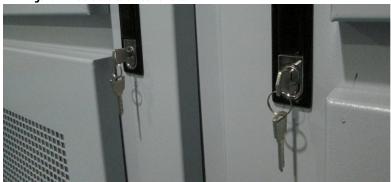


IMPORTANT

Any claims for visible breakage or damage must be made to the freight company by the user as soon as possible after receipt of shipment. Rockwell Automation will provide the user with reasonable assistance in the securing of adjustment for such damage claims.

Access to the medium voltage cabinets of the drive is restricted by the use of lockable handles. The cabinet keys are located in the same document/hardware box as the EDs and DDs (see Required Supplemental Information on page 9). The box is accessible through the opening in the cabinet side sheet (without opening a door).

Figure 2 - Lockable Cabinet Handles



Drive Configurations

There are two basic power cell configurations offered in the PowerFlex 6000 product line. For a drive amperage rating \leq 200 A, a fixed-mounted power module design is supplied. Fixed-mounted modules are shipped installed in the drive. For a drive amperage rating of >200 A, a drawout power module design is supplied. The drawout power modules are removed from the drive before shipment and shipped in separate crates.

The cabinets may appear slightly different than shown in the illustrations, based on voltage class and whether the drive configuration has fixed-mounted or drawout power modules (see <u>Figure 31</u> and <u>Figure 32</u>).

Shipment List

The complete shipment will consist of a number of crates, as shown below:

Table 1 - Shipment Configurations

VFD Motor V and Amp Ra		Bypass Cabinet (optional)	Isolation Transformer Cabinet ⁽¹⁾	Power Module/ LV Control Cabinet	Power Modules ⁽²⁾	Power Module Lift Cart ⁽³⁾	Main Cooling Fans ⁽⁴⁾
3/3.3 kV	≤200 A	1 crate	1 crate	1 crate	Fixed-mounted	No	3 fans per crate
	>200 A	1 crate	1 crate	1 crate	Drawout (1 crate)	Yes	3 fans per crate
6/6.6 kV	≤200 A	1 crate	1 crate	1 crate	Fixed-mounted	No	3 fans per crate
	>200 A	1 crate	1 crate	1 crate	Drawout (2 crates)	Yes	3 fans per crate
10 kV	≤200 A	1 crate	1 crate	1 crate	Fixed-mounted	No	3 fans per crate
	>200 A	1 crate	1 crate	1 crate	Drawout (3 crates)	Yes	3 fans per crate

- (1) The document/hardware box contains:
 - PowerFlex 6000 Medium Voltage Variable Frequency Drive User Manual (6000-UM001_-EN-P)
 - PowerFlex 6000 Medium Voltage Variable Frequency Drive Commissioning Manual (6000-IN007_-EN-P)
 - PowerFlex 6000 Medium Voltage Bypass Cabinet User Manual (if supplied) (6000-UM002_-EN-P)
 - Testing Reports
 - Electrical Drawings (EDs) and Dimensional Drawings (DDs)
 - Certifications
 - All necessary hardware for mounting lifting angles and fan assemblies, and securing the cabinets together.
 - Keys for the lockable cabinet handles
 - The locking key for drawout power modules, if supplied
- (2) Up to nine drawout Power Modules can be shipped in one crate.
- (3) The Power Module lift cart is wrapped in plastic for shipment within China, and crated for shipment outside of China.
- (4) Refer to Dimensional Drawings or PowerFlex 6000 Dimensions and Weights (For IEC) on page 123 to determine the number of fans/crates.

Initial Inspection Checklist

Table 2 - Shipping Damage Assessment

Bypass Cabinet (if supplied)	Isolation Transformer Cabinet	Power Module Cabinet	Low Voltage Control Cabinet
Low Voltage Door:	Low Voltage Door:	Fixed-mounted:	Low Voltage Door:
☐ Pilot Lights	☐ Transformer Temperature monitor relay	Power module retaining tabs	☐ Pilot lights
☐ Voltage Indicator Relay	Cabinet:	Drawout:	☐ Push buttons
Cabinet:	☐ Voltage Sensing Board	☐ Power Module Support frame	☐ HMI Interface
☐ Insulators☐ Switch assemblies☐ Vacuum contactors☐ Mechanical linkages	 ☐ Incoming Line Power Cable Terminal Insulators ☐ Outgoing Load Power Cable Terminal Insulators ☐ Transformer Secondary Windings — Inspect nomex wrap — Verify windings from core are undamaged — Check for debris in top of core 	☐ Power modules (shipped in separate crate(s))	Panel: □ DIN rail mounted components □ UPS □ Fiber optic cables □ PLC □ Control Unit

Storage

Store the drive in a dry, clean and cool area.

The storage temperature must be maintained between -25...55 °C. If the storage temperature fluctuates significantly or if the relative humidity exceeds 90%, use heating and moisture protection devices to prevent condensation.

Store the drive in a conditioned building with adequate air circulation. Do not store the drive outdoors.

Installation Site Requirements

Environmental Conditions

- Elevation above sea level must be less than 1000 m (3250 ft)⁽¹⁾.
- Ambient air temperature must be between 0...40°C (32...104°F)⁽²⁾.
- Relative humidity must be less than 90%, non-condensing.
- The drive must be installed indoors; there must be no dripping water or other fluids in the room.
- Cooling air must be clean without significant concentrations of sand, corrosive or conductive dust (defined by IEC 721-1 as being less than 0.2 mg/m³ of dust), or explosive gas.
- Free from significant vibration.
- The drive must be anchored on a level floor. Please refer to the dimension drawing for the anchor point sizes and locations.

For the equipment to operate in conditions other than those specified, consult the local Rockwell Automation Sales Office.

⁽¹⁾ Options are available for operation up to 3000 m.a.s.l. However, these must be stated at the time of order and cannot be retrofitted in the field.

⁽²⁾ Options are available for ambient temperatures up to 50 °C. However, these must be stated at the time of order and cannot be retrofitted in the field.

Mounting Clearance Distance

Install the drive with appropriate clearance distances on all sides to ensure proper operation and allow maintenance of the drive.

Table 3 - Minimum Mounting Clearance Distances

Location	Minimum Distance Required, approx.		
In Front	• 1500 mm (60 in.)		
Behind	• 1000 mm (39 in.)		
Above ⁽¹⁾	400 mm (16 in.) without ducting requirements 1000 mm (39 in.) with ducting requirements		

⁽¹⁾ Distance above is measured from the top plate of the drive cabinet (excludes height of fan housing).

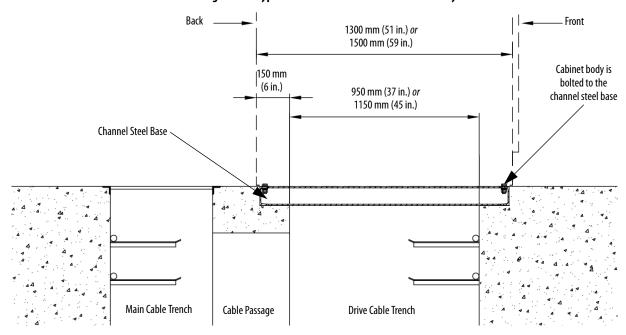


ATTENTION: An incorrectly applied or installed drive can result in component damage or reduction in product life. Ambient conditions not within the specified ranges may result in malfunction of the drive.

Mounting Requirements

The base must be smooth, flat and level. If power cabling is entering from below, and a cable trench system is used, refer to Figure 3. The base structure of the drive cabinet may be constructed with #10 channel steel, approximately $100 \times 48 \times 5.3 \text{ mm}$ (3.9 x 1.9 x 0.2 in.). Dimension pairs reflect the 1300 mm or 1500 mm deep cabinet configurations and the corresponding Drive Cable Trench depth.See PowerFlex 6000 Dimensions and Weights (For IEC) on page 123.

Figure 3 - A typical cross-sectional view of the trench system



Embed the channel steel base profile in the base with its top surface flush with ground level, or protruding slightly above ground level.

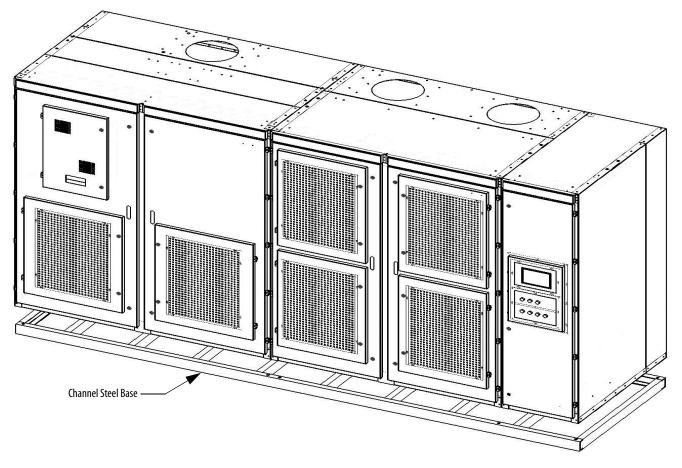


Figure 4 - Channel Steel Base Location

Bolt or weld the drive cabinet on the profile steel base (Refer to <u>Affix Cabinets to Floor on page 48</u>). A reliable connection must be made between the steel base and the cabinet. The steel base profile shall be reliably grounded.

Moving with Rod or Pipe Rollers

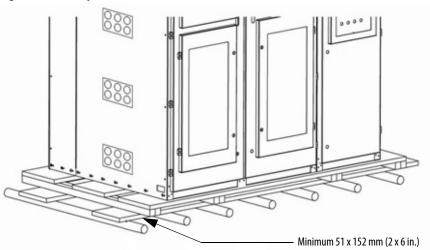
This method is only suitable when there are no inclines and the drive is moved on the same floor.

Boards with cross section of about 50×150 mm (2×6 in.) and length of at least 300 mm (12 in.) longer than the drive must be placed under the wooden skid.

Lift the cabinet and carefully and slowly lower the drive cabinet onto the roller pipes until the drive weight is borne on the roller pipes. Do not remove the shipping skid; the skid is required for this process (Refer to Attach the Overhead Lifting Cables on page 22).

Roll the drive to its destination location. Steady the cabinet to prevent tipping.

Figure 5 - Rod or Pipe Rollers

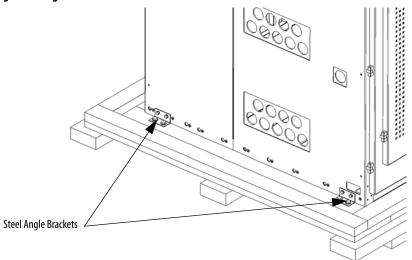


Remove the Wooden Skids

Remove the wooden shipping skids when the drive is in its final installation location. Steel angle brackets bolt the cabinet to the wooden shipping skid. Remove this hardware, lift the cabinets off the skids, and remove the skids from underneath.

Refer to <u>Lift the Power Module/LV Control Cabinet on page 21</u> and <u>Lift the Isolation Transformer Cabinet on page 25</u>.

Figure 6 - Angle Brackets



Overhead Lifting Methods

The preferred method of lifting the cabinets is an overhead crane. If overhead lifting with a crane is not available, use a fork lift with a capacity greater than the cabinet weight. Lift the cabinet using the overhead lifting angles or isolation transformer lifting provisions and suitable spreader bars and rigging attached to the fork lift.

IMPORTANT	Close and lock the cabinet doors before	e moving any cabinets.
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Lift the Power Module/LV Control Cabinet

Two lifting angles are used for the Power Module/LV Control Cabinet and are affixed to either side of the shipping skid.

The length of the lifting angles depends on the length of the Power Module/LV Control Cabinet.

Table 4 - Lifting Angles

Length, approx.	Dimensions, approx.	Weight per Angle, approx.
1.2 m (3.9 ft)	100 x 80 x 8 mm (3.9 x 3.1 x 0.32 in.)	13.1 kg (29 lb)
2.0 m (6.6 ft)	100 x 80 x 8 mm (3.9 x 3.1 x 0.32 in.)	21.9 kg (48 lb)
2.4 m (7.9 ft)	100 x 80 x 8 mm (3.9 x 3.1 x 0.32 in.)	26.3 kg (58 lb)
3.5 m (11.6 ft)	125 x 80 x 10 mm (4.9 x 3.1 x 0.39 in.)	54.6 kg (120 lb)
4.2 m (13.6 ft)	125 x 80 x 10 mm (4.9 x 3.1 x 0.39 in.)	64.1 kg (141 lb)
4.9 m (16.1 ft)	125 x 80 x 10 mm (4.9 x 3.1 x 0.39 in.)	75.8 kg (167 lb)

Install the Lifting Angles

IMPORTANT Label and retain all lifting-related hardware if the drive system may be moved in the future.



ATTENTION: Failure to install the pair of lifting angles prior to moving the drive may result in personal injury and/or equipment damage.

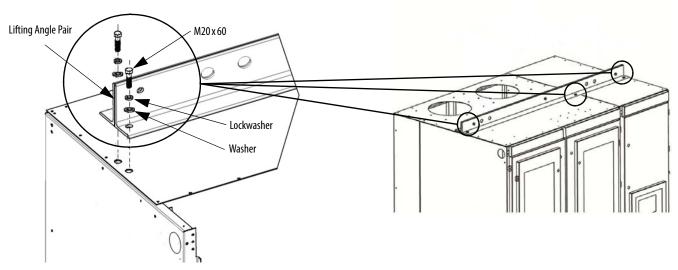
The lifting angles hold the Power Module/LV Control cabinets together to prevent separation and damage while riggers move the drive to the final installation area.

The lifting angles are shipped with the Power Module/LV Control Cabinet and must be secured before lifting the cabinet.

- 1. Remove the lifting angles from the skid.
- 2. Remove the attachment hardware that is pre-installed in the mounting holes in the cabinet top plate before shipment.

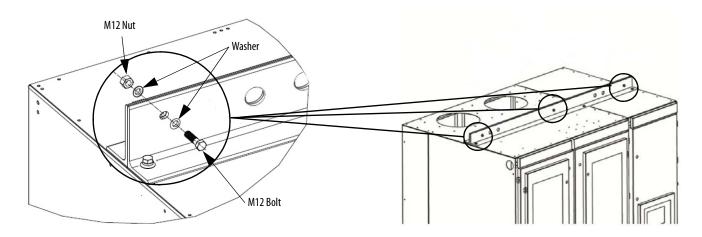
3. Align and secure the lifting angles in six places as shown in Figure 7 using the hardware removed in step 2.

Figure 7 - Install Fasteners from the Lifting Angles to the Drive in six places



4. Install the supplied hardware (M12 bolt and nut, two flat washers) to join the lifting angles together in three places (Figure 8).

Figure 8 - Bolt vertical slots on the Lifting Angles in three places



Attach the Overhead Lifting Cables

1. Attach rigging assembly firmly to the lifting angles on the top of the Power Module/LV Control Cabinet (Figure 9).



ATTENTION: The load carrying capacity of the lifting device and rigging must be sufficient to safely raise the cabinet. Check the shipping weights by referring to the container's commercial invoice.



ATTENTION: Do not pass cables through the support holes in the lifting angles. Use slings with safety hooks or shackles.

- 2. Adjust the rigging lengths to compensate for any unequal weight distribution of load.
 - TIP There are pairs of holes to attach lifting cables on either end of the lifting angle. Generally use the outside holes on either end for the greatest stability. The inner holes could be used to adjust for the cabinet's center of gravity.

The cabinet must remain in an upright position.

To reduce the tension on the rigging and the compressive load on the lifting device, do not allow the angle between the lifting cables and vertical to exceed 45° (Figure 9).



ATTENTION: Do not tilt the drive.

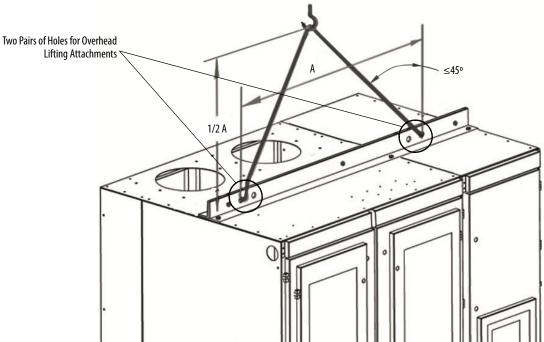


Figure 9 - Overhead Lifting (Power Module/LV Control Cabinet)

3. Remove the steel angle brackets bolting the cabinet to the skid.

4. Lift the cabinet using overhead lifting angles and remove the wooden shipping skid from under the equipment.



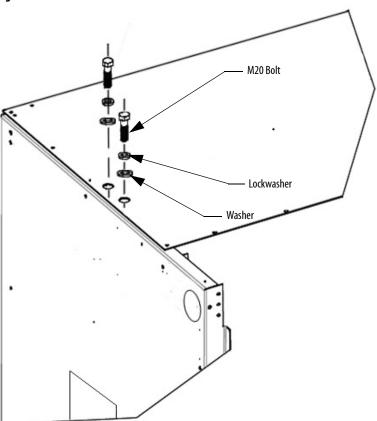
ATTENTION: Only lift the cabinet high enough to remove the shipping skid at this point. Do not place any parts of the body underneath the cabinet. Remove the shipping skid from the work area before continuing.

Remove Overhead Lifting Cables and Lifting Angles

When the cabinet is in the desired position, remove the lifting angles.

- 1. Remove rigging from the lifting angles, and remove the bolts holding the lifting angles together; retain or recycle hardware.
- 2. Remove and retain the hardware from the base of the lifting angles and retain or recycle the lifting angles.
- 3. Reinstall the hardware $(M20 \times 60)$ removed in step 2 (to seal the holes) on the top of the drive (Figure 10).

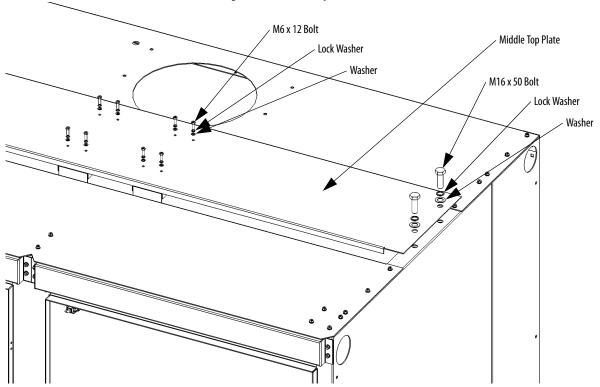
Figure 10 - Insert bolts



Lift the Isolation Transformer Cabinet

1. Unfasten and remove the middle top plate on top of the cabinet, and retain middle top plate and hardware.

Figure 11 - Remove Top Middle Plate



The cabinet version with a single main cooling fan will have two support brackets. The cabinet version with two fans will have three support brackets.

Most configurations have one or two top-mounted main cooling fans in the isolation transformer cabinet. However, high power configurations can have more.

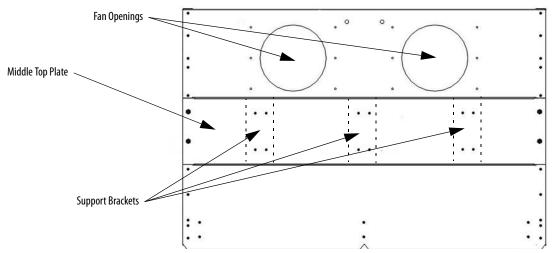
Fan Opening

Middle Top Plate

Support Brackets

Figure 12 - Isolation Transformer with one Fan Assembly (Overhead view)

Figure 13 - Isolation Transformer with two Fan Assemblies (Overhead view)



2. Attach the steel cable to the U-ring attachments (Figure 14), ensuring the cables pass freely though the center section of the cabinet and that they do not contact the middle top plate support brackets.

3. Attach the U-ring attachments to the lifting provisions on the isolation transformer.

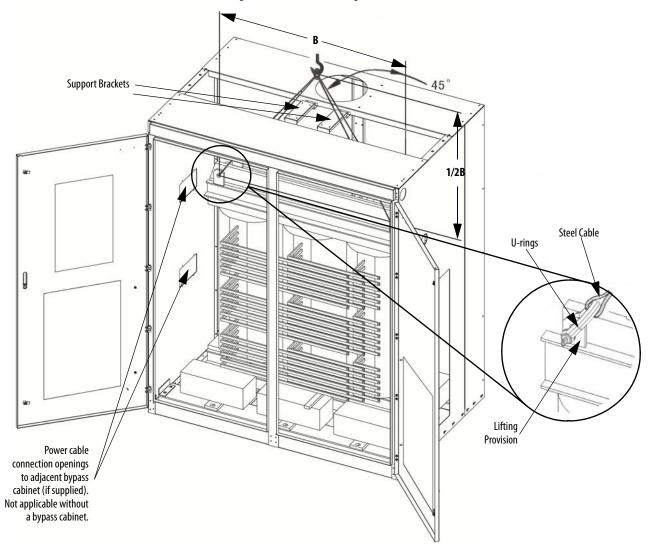


Figure 14 - Overhead Lifting (Isolation Transformer Cabinet)



ATTENTION: The cabinet is attached to the base of the isolation transformer. The cabinet is designed to be lifted only by the isolation transformer lifting provisions. Do not attach cables to the Isolation Transformer cabinet.

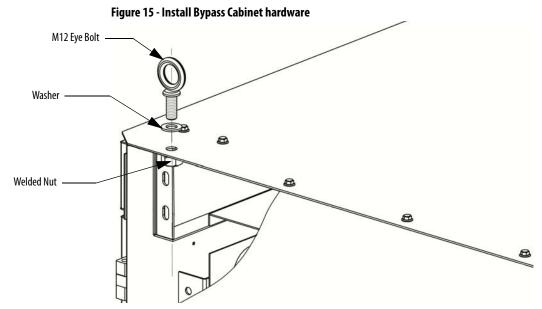


ATTENTION: Keep the weight of the isolation transformer centered when lifting. It is recommended to use the four lifting provisions at all corners of the isolation transformer. Alternatively, the two lifting provisions diagonally opposed could be used.

Lift the Bypass Cabinet

If the optional Bypass Cabinet is supplied, lift the Bypass Cabinet using four M12 eye bolts. The back plate does not have to be removed to install the M12 nuts as they are welded to the inside of the top plate. Refer to Torque Requirements on page 119 for appropriate torque requirements.

1. Install four M12 eye bolts and washers in each corner of the top plate on the cabinet.



2. Attach a steel cable or other suitable lifting rigging to the eye bolts. The lifting rigging must meet lifting capacity requirements.

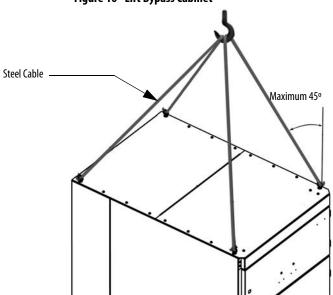


Figure 16 - Lift Bypass Cabinet

- **3.** When the cabinet is in the desired position, remove the steel cable, and hardware.
- **4.** Replace the eye bolts with four M12 bolts and washers provided in the document/hardware box.

Shipping and Handling Procedures (For UL)

This document pertains to PowerFlex 6000 medium voltage drives and also mentions the optional bypass cabinets. Additional procedures may apply for specific equipment. Refer to other documentation provided with the equipment.

IMPORTANT

Chapter 1 contains important information about offloading the drive crates and handling the drive cabinets. Review this chapter before attempting to offload the crates from the delivery truck and move the drive cabinets. The instructions help you safely offload and transport your Rockwell Automation Medium Voltage product to the installation site.



WARNING: Never attempt to lift or move the drive by any means other than the handling methods listed in this publication. Failure to do so may result in personal injury or death, damage to the drive, and potential economic loss.

Overview

The PowerFlex 6000 drive cabinets are bolted to wooden skids and placed into wooden shipping crates. After the crating is removed, the cabinets must remain bolted to the wooden skids until moved to its final installation area. Lifting angles are affixed to the shipping skid on either side of the cabinetry, where applicable. The cabinets must remain in an upright position during handling.



ATTENTION: The load carrying capacity of the lifting device and rigging must be sufficient to safely raise the drive. Check the shipping weights by referring to the container's commercial invoice.

Round rollers can be used to assist in moving the cabinets to the installation site. Once at the final site, the pipe rolling technique can be used to place the cabinet in the desired location.



WARNING: Exercise extreme caution when moving the drive to ensure the equipment is not scratched, dented or damaged in any manner. Stabilize the drive during handling to prevent tipping and injury to personnel.

Any error in transporting or installing the drive will delay the drive commissioning progress.

General Handling Information

- Rockwell Automation strongly recommends using professional riggers with suitable rated lifting equipment to move the drive to the final installation site.
- Qualified professionals must inspect all lifting equipment prior to moving the cabinets.
- Keep the cabinets in an upright position. Some units are top-heavy and may fall over if tilted.
- The cabinets are not rigid structures. Do not torque or twist the cabinets while siting the drives or joining the shipping splits.
- Use fasteners with a minimum metric Grade 10.9 (SAE Grade 8) strength. Rockwell Automation recommends using Crosby bolt-type shackles.
- All lifting cables must meet lifting capacity requirements.
- Close and secure all drive doors before moving the equipment.
- Keep the cabinets bolted to the wooden shipping skids to minimize the
 possibility of it tipping. Do not remove the wooden skid until the cabinets
 are at the final installation area. Depending on the type of drive cabinet,
 the crate may include a pair of lifting angles. Install both lifting angles on
 top of the cabinet.



ATTENTION: Do not stand near or underneath equipment being lifted overhead.



ATTENTION: Restrict access to areas where equipment will be lifted overhead to prevent access from unauthorized personnel.

Offloading and Moving Crates

Fork Lifts

The terms fork lift, lift truck, and fork lift truck are all commonly used and refer to the same thing. A single fork lift may be used for offloading and moving cabinets up to 4 m (157 in.) wide, if the fork lift has sufficient lifting capacity. Cabinets exceeding 4 m should be offloaded and moved with two fork lifts operating in tandem.

- Insert the forks into the openings of the wooden shipping skid.
- Balance the crates on the forks. The crates can be heavier on one side.
- Use safety straps when handling to steady the crate while moving.

Unpack and Inspect the Drive

Before leaving the factory, all drives have undergone both performance and quality tests. However, damage may occur during the shipping or handling process.

Immediately upon receiving the drive, inspect the crates for signs of damage. After the crates are offloaded, disassemble the crating and check for possible shipping damage. Use a crowbar or other suitable tool to carefully remove the packaging. Do not insert the tool too far into the packaging or damage to the drive cabinet may occur. Inspect the drive cabinets for physical damage according to the Rockwell Automation Conditions of Sale. Open the doors and inspect the major components for signs of damage (Table 6).

Figure 17 - Crated Cabinet

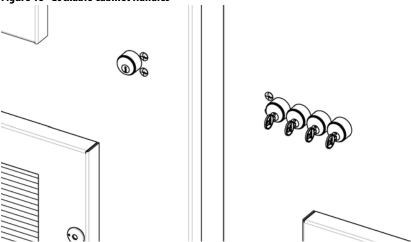


IMPORTANT

Any claims for visible breakage or damage must be made to the freight company by the user as soon as possible after receipt of shipment. Rockwell Automation will provide the user with reasonable assistance in the securing of adjustment for such damage claims.

Access to the medium voltage cabinets of the drive is restricted by the use of lockable handles. The cabinet keys are located in the same document/hardware box as the EDs and DDs (see <u>Required Supplemental Information on page 9</u>). The box is accessible through the opening in the cabinet side sheet (without opening a door).

Figure 18 - Lockable Cabinet Handles



Drive Configurations

There are two basic power cell configurations offered in the PowerFlex 6000 product line. For a drive amperage rating \leq 200 A, a fixed-mounted power module design is supplied. Fixed-mounted modules are shipped installed in the drive.

The cabinets may appear slightly different than shown in the illustrations, based on voltage class (see <u>Figure 40</u>).

Shipment List

The complete shipment will consist of a number of crates, as shown below:

Table 5 - Shipment Configurations

VFD Motor Voltage Class and Amp Rating	Bypass Cabinet (optional)	Isolation Transformer Cabinet ⁽¹⁾	Power Module/ LV Control Cabinet	Power Modules	Power Module Lift Cart ⁽²⁾
2.3/2.4 kV	1 crate	1 crate	1 crate	Fixed-mounted	No
4.0/4.16 kV	1 crate	1 crate	1 crate	Fixed-mounted	No
6.0 kV	1 crate	1 crate	1 crate	Fixed-mounted	No
6.3 kV	1 crate	1 crate	1 crate	Fixed-mounted	No
6.6 kV	1 crate	1 crate	1 crate	Fixed-mounted	No

- (1) The document/hardware box contains:
 - PowerFlex 6000 Medium Voltage Variable Frequency Drive User Manual (6000-UM001_-EN-P)
 - PowerFlex 6000 Medium Voltage Variable Frequency Drive Commissioning Manual (6000-IN007_-EN-P)
 - PowerFlex 6000 Medium Voltage Bypass Cabinet User Manual (if supplied) (6000-UM002_-EN-P)
 - Testing Reports
 - Electrical Drawings (EDs) and Dimensional Drawings (DDs)
 - Certifications
 - $\bullet \ All \ necessary \ hardware \ for \ mounting \ lifting \ angles \ and \ fan \ assemblies, \ and \ securing \ the \ cabinets \ together.$
 - Keys for the lockable cabinet handles
- (2) The Power Module lift cart is wrapped in plastic for shipment within China, and crated for shipment outside of China.

Initial Inspection Checklist

Table 6 - Shipping Damage Assessment

Isolation Transformer Cabinet	Power Module Cabinet	Low Voltage Control Cabinet
Low Voltage Door:	Fixed-mounted:	Low Voltage Door:
☐ Transformer Temperature monitor	Power module retaining tabs	☐ Pilot lights
relay		Push buttons
Cabinet:		☐ HMI Interface
Voltage Sensing Board		Panel:
Incoming Line Power Cable		☐ DIN rail mounted components
Terminal Insulators		☐ UPS
☐ Outgoing Load Power Cable		☐ Fiber optic cables
Terminal Insulators		□ PLC
☐ Transformer Secondary Windings		☐ Control Unit
 Inspect nomex wrap 		
 Verify windings from core are undamaged 		
 Check for debris in top of core 		

Storage

Store the drive in a dry, clean and cool area.

The storage temperature must be maintained between -25...55 $^{\circ}$ C (-13....131 $^{\circ}$ F). This temperature rating applies only to the drive, it does not include the UPS (uninterruptible power supply). If the storage temperature fluctuates significantly or if the relative humidity exceeds 90%, use heating and moisture protection devices to prevent condensation.

Store the drive in a conditioned building with adequate air circulation. Do not store the drive outdoors.

Installation Site Requirements

Environmental Conditions

- Elevation above sea level must be less than 1000 m (3250 ft)⁽¹⁾.
- Ambient air temperature must be between 0...40 °C (32...104 °F) $^{(2)}$.
- Relative humidity must be less than 90%, non-condensing.
- The drive must be installed indoors; there must be no dripping water or other fluids in the room.
- Cooling air must be clean without significant concentrations of sand, corrosive or conductive dust, or explosive gas.
- Free from significant vibration.
- The drive must be anchored on a level floor. Please refer to the dimension drawing for the anchor point sizes and locations.

For the equipment to operate in conditions other than those specified, consult the local Rockwell Automation Sales Office.

⁽¹⁾ Options are available for operation up to 3000 m.a.s.l. However, these must be stated at the time of order and cannot be retrofitted in the field.

⁽²⁾ Options are available for ambient temperatures up to 50 °C (122 °F). However, these must be stated at the time of order and cannot be retrofitted in the field.

Mounting Clearance Distance

Install the drive with appropriate clearance distances on all sides to ensure proper operation and allow maintenance of the drive.

Table 7 - Minimum Mounting Clearance Distances

Location	Minimum Distance Required, approx.
In Front	• 1500 mm (60 in.)
Behind	• 1000 mm (39 in.)
Above ⁽¹⁾	• 1000 mm (39 in.)

⁽¹⁾ Distance above is measured from the top plate of the drive cabinet (excludes height of fan housing).

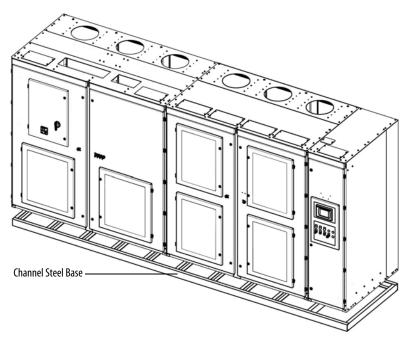


ATTENTION: An incorrectly applied or installed drive can result in component damage or reduction in product life. Ambient conditions not within the specified ranges may result in malfunction of the drive.

Mounting Requirements

The base must be smooth, flat and level. The base structure of the drive cabinet may be constructed with #10 channel steel, approximately $100 \times 48 \times 5.3 \text{ mm}$ (3.9 x 1.9 x 0.2 in.). Dimension pairs reflect the 1300 mm deep cabinet configuration and the corresponding Drive Cable Trench depth. See PowerFlex 6000 Dimensions and Weights (For UL) on page 131.

Figure 19 - Channel Steel Base Location



Bolt or weld the drive cabinet on the profile steel base (See <u>Affix Cabinets to Floor on page 62</u>). A reliable connection must be made between the steel base and the cabinet. The steel base profile shall be reliably grounded.

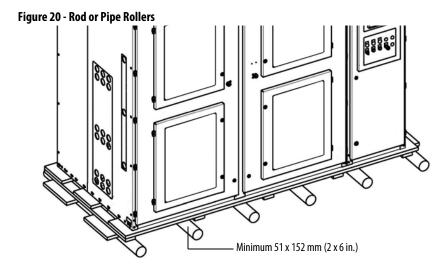
Moving with Rod or Pipe Rollers

This method is only suitable when there are no inclines and the drive is moved on the same floor.

Boards with cross section of about 50×150 mm (2×6 in.) and length of at least 300 mm (12 in.) longer than the drive must be placed under the wooden skid.

Lift the cabinet and carefully and slowly lower the drive cabinet onto the roller pipes until the drive weight is borne on the roller pipes. Do not remove the shipping skid; the skid is required for this process (See <u>Attach the Overhead Lifting Cables on page 38</u>).

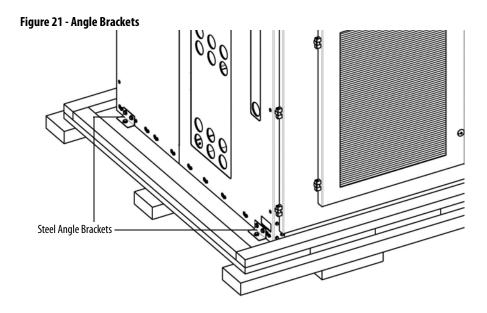
Roll the drive to its destination location. Steady the cabinet to prevent tipping.



Remove the Wooden Skids

Remove the wooden shipping skids when the drive is in its final installation location. Steel angle brackets bolt the cabinet to the wooden shipping skid. Remove this hardware, lift the cabinets off the skids, and remove the skids from underneath.

Refer to <u>Lift the Power Module/LV Control Cabinet on page 36</u> and <u>Lift the Isolation Transformer Cabinet on page 40</u>.



Overhead Lifting Methods

The preferred method of lifting the cabinets is an overhead crane. If overhead lifting with a crane is not available, use a fork lift with a capacity greater than the cabinet weight. Lift the cabinet using the overhead lifting angles or isolation transformer lifting provisions and suitable spreader bars and rigging attached to the fork lift.

IMPORTANT Close and lock the cabinet doors before moving any cabinets.

Lift the Power Module/LV Control Cabinet

Two lifting angles are used for the Power Module/LV Control Cabinet and are affixed to either side of the shipping skid.

The length of the lifting angles depends on the length of the Power Module/LV Control Cabinet.

Table 8 - Lifting Angles

Length, approx.	Dimensions, approx.	Weight per Angle, approx.
1.55 m (5.08 ft)	100 x 80 x 8 mm (3.9 x 3.1 x 0.32 in.)	17.0 kg (37 lb)
1.79 m (5.87 ft)	100 x 80 x 8 mm (3.9 x 3.1 x 0.32 in.)	19.6 kg (43 lb)
2.18 m (7.15 ft)	100 x 80 x 8 mm (3.9 x 3.1 x 0.32 in.)	23.9 kg (53 lb)
2.32 m (7.61 ft)	100 x 80 x 8 mm (3.9 x 3.1 x 0.32 in.)	25.4 kg (56 lb)
2.80 m (9.19 ft)	100 x 80 x 8 mm (3.9 x 3.1 x 0.32 in.)	30.6 kg (67 lb)

Install the Lifting Angles

IMPORTANT

Label and retain all lifting-related hardware if the drive system may be moved in the future.



ATTENTION: Failure to install the pair of lifting angles prior to moving the drive may result in personal injury and/or equipment damage.

The lifting angles hold the Power Module/LV Control cabinets together to prevent separation and damage while riggers move the drive to the final installation area.

The lifting angles are shipped with the Power Module/LV Control Cabinet and must be secured before lifting the cabinet.

- 1. Remove the lifting angles from the skid.
- **2.** Remove the attachment hardware that is pre-installed in the mounting holes in the cabinet top plate before shipment.
- 3. Align and secure the lifting angles in six places as shown in Figure 22 using the hardware removed in step 2.

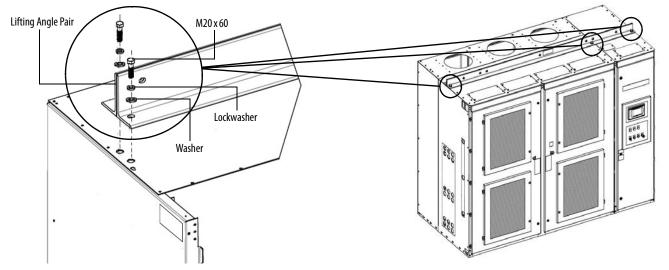


Figure 22 - Install Fasteners from the Lifting Angles to the Drive in six places

4. Install the supplied hardware (M12 bolt and nut, two flat washers) to join the lifting angles together in three places (<u>Figure 23</u>).

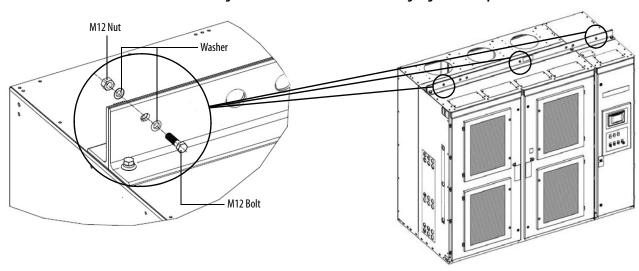


Figure 23 - Bolt vertical slots on the Lifting Angles in three places

Attach the Overhead Lifting Cables

1. Attach rigging assembly firmly to the lifting angles on the top of the Power Module/LV Control Cabinet (Figure 24).



ATTENTION: The load carrying capacity of the lifting device and rigging must be sufficient to safely raise the cabinet. Check the shipping weights by referring to the container's commercial invoice.



ATTENTION: Do not pass cables through the support holes in the lifting angles. Use slings with safety hooks or shackles.

2. Adjust the rigging lengths to compensate for any unequal weight distribution of load.

TIP There are pairs of holes to attach lifting cables on either end of the lifting angle. Generally use the outside holes on either end for the greatest stability. The inner holes could be used to adjust for the cabinet's center of gravity.

The cabinet must remain in an upright position.

To reduce the tension on the rigging and the compressive load on the lifting device, do not allow the angle between the lifting cables and vertical to exceed 45° (Figure 24).



ATTENTION: Do not tilt the drive.

Figure 24 - Overhead Lifting (Power Module/LV Control Cabinet)

- 3. Remove the steel angle brackets bolting the cabinet to the skid.
- **4.** Lift the cabinet using overhead lifting angles and remove the wooden shipping skid from under the equipment.



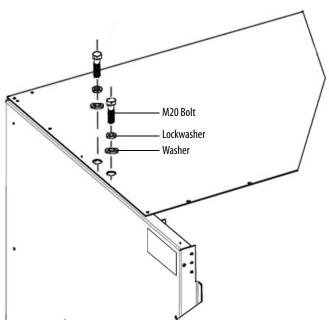
ATTENTION: Only lift the cabinet high enough to remove the shipping skid at this point. Do not place any parts of the body underneath the cabinet. Remove the shipping skid from the work area before continuing.

Remove Overhead Lifting Cables and Lifting Angles

When the cabinet is in the desired position, remove the lifting angles.

- 1. Remove rigging from the lifting angles, and remove the bolts holding the lifting angles together; retain or recycle hardware.
- 2. Remove and retain the hardware from the base of the lifting angles and retain or recycle the lifting angles.
- 3. Reinstall the hardware $(M20 \times 60)$ removed in step 2 (to seal the holes) on the top of the drive (Figure 25).

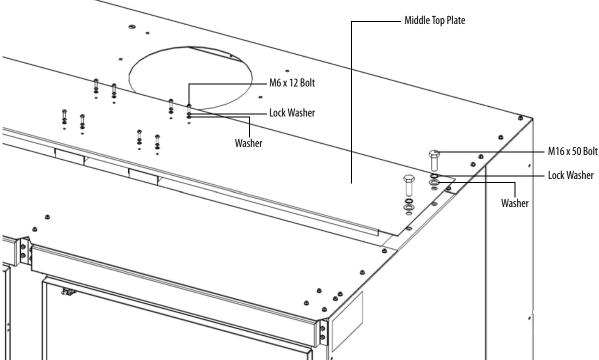
Figure 25 - Insert bolts



Lift the Isolation **Transformer Cabinet**

1. Unfasten and remove the middle top plate on top of the cabinet, and retain middle top plate and hardware.

Figure 26 - Remove Top Middle Plate



The cabinet version with a single main cooling fan will have two support brackets. The cabinet version with two fans will have three support brackets.

Most configurations have one or two top-mounted main cooling fans in the isolation transformer cabinet. However, high power configurations can have more.

Figure 27 - Isolation Transformer with one Fan Assembly (Overhead view)

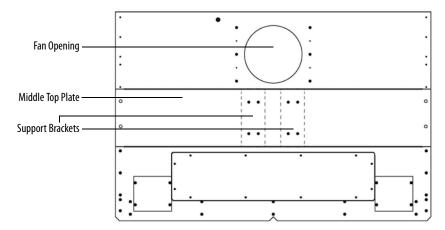
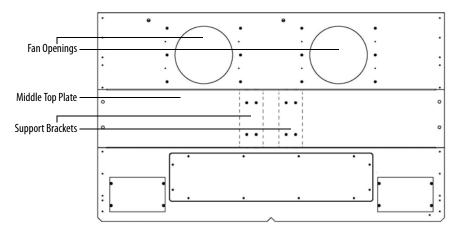
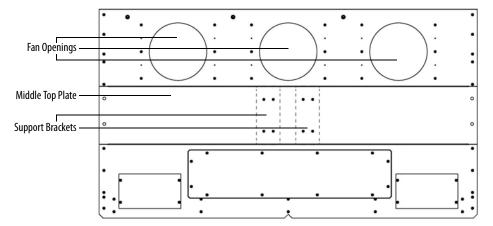


Figure 28 - Isolation Transformer with two Fan Assemblies (Overhead view)



2. Attach the steel cable to the U-ring attachments (Figure 30), ensuring the cables pass freely though the center section of the cabinet and that they do not contact the middle top plate support brackets.

Figure 29 - Isolation Transformer with three Fan Assemblies (Overhead view)



3. Attach the U-ring attachments to the lifting provisions on the isolation transformer.

Support Brackets

U-rings Steel Cable

Figure 30 - Overhead Lifting (Isolation Transformer Cabinet)



ATTENTION: The cabinet is attached to the base of the isolation transformer. The cabinet is designed to be lifted only by the isolation transformer lifting provisions. Do not attach cables to the Isolation Transformer cabinet.

Lifting Provision



ATTENTION: Keep the weight of the isolation transformer centered when lifting. It is recommended to use the four lifting provisions at all corners of the isolation transformer. Alternatively, the two lifting provisions diagonally opposed could be used.

Drive Mechanical Installation (For IEC)

Introduction

The installation process is divided into three principal activities. The mechanical installation process described in this chapter, the electrical installation process described in <u>Drive Electrical Installation (For IEC)</u> on page 67, and the electrical interconnection process described in <u>Drive Electrical Interconnection (For IEC)</u> on page 95.

Mechanical Installation Summary

The cabinets must be arranged as shown in the Dimensional Drawing.

Connect Shipping Splits	<u>43</u>
Affix Cabinets to Floor	<u>48</u>
Install Main Cooling Fans	<u>50</u>
Install Drawout Power Modules (if applicable)	<u>51</u>
External Ducting	<u>55</u>

Follow all applicable guidelines for siting the components before continuing with these installation instructions.

There may be some variation in the process depending on the type and number of drive components in your particular installation.

Connect Shipping Splits



ATTENTION: Install the drive on a level surface (+/- 1 mm per meter [+/- 0.036 in. per 36 in.] of drive length in all directions). If necessary, use metal shims to level the cabinets before joining them; attempting to level after joining may twist or misalign the cabinets.

The PowerFlex 6000 drive is shipped in two sections, the Isolation Transformer Cabinet and Power Module/LV Control Cabinet. These two cabinets must be connected after located in its final position. The cabinets are connected together in 10 places, five along the front edge of the cabinet and five along the rear edge of the cabinet. Access to the interior of the cabinet is required to make these connections. Access for the front connections requires only opening the doors. Access for the rear connections requires removing the back plates of the cabinet.

IMPORTANT

Rear access to all cabinets is required for subsequent processes. Do not reinstall back plates until after the conclusion of the Drive Electrical Interconnection process.

1. Arrange the sections as directed in the Dimensional Drawings and move the sections together.

2. Align the cabinet side sheets together at the holes for the hardware (see step 3).

Bypass Cabinet (Optional) Power Module/LV Control Cabinet **Isolation Transformer Cabinet** 866 噩 000 **Table 9 - Sidesheet Openings 2**() 0 1 Front Wireway 0 Rear Wireway 8 U Phase Motor Cable 4 V Phase Motor Cable 3 6 W Phase Motor Cable 8 **Ground Bus Connection** 6 Voltage Sensing Board Cables 0 4 Isolation Transformer Secondary Cables⁽¹⁾ 4 (1) The number of Isolation Transformer secondary cables is dependent on motor voltage class. $\bullet\,9$ cables per motor phase (27 total) for 3/3.3 kV •18 cables per motor phase (54 total) of 6/6.6 kV • 27 cables per motor phase (81 total) for 10 kV ⊐6 ຼ Front

Figure 31 - Aligning Cabinets with Fixed-mounted Power Modules (6/6.6 kV shown)

SIDE VIEW

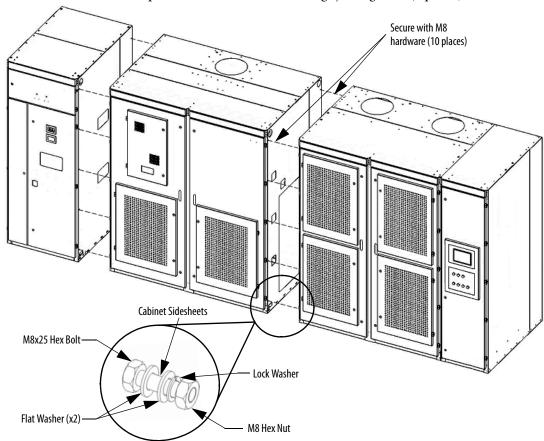
Bypass Cabinet Power Module/LV Control Cabinet **Isolation Transformer Cabinet** (Optional) 0000 Ò 845 648 Table 10 - Sidesheet Openings 0 0 Front Wireway 0 0 0 **Rear Wireway** ₿ U Phase Motor Cable V Phase Motor Cable 4 6 W Phase Motor Cable 6 **Ground Bus Connection Voltage Sensing** Board Cables Isolation Transformer Secondary Cables⁽¹⁾ (2) 8 8 8 (1) The number of Isolation Transformer secondary cables is dependent on motor voltage class. • 9 cables per motor phase (27 total) for 3/3.3 kV •18 cables per motor phase (54 total) of 6/6.6 kV • 27 cables per motor phase (81 total) for 10 kV (2) 6/6.6 kV configurations only require 18 cable hole locations per phase. Extra cable hole locations allow for added installation flexibility. Front -Front

Figure 32 - Aligning Cabinets with Drawout Power Modules (6/6.6 kV shown)

SIDE VIEW

3. Secure the cabinets together using M8 hardware. See <u>Torque</u> Requirements on page 119 for proper torque requirements.

Open the doors to access front edge joining holes (5 places).

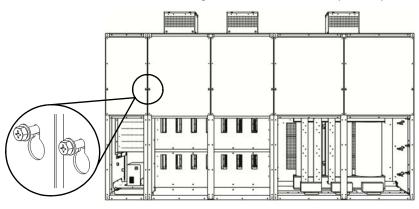


4. Remove all back plates to access rear edge joining holes (5 places).

TIP Each back plate will have two keyhole screw holes on either side. Remove all of the other screws first. Loosen the two screws in the keyhole screw holes last and lift the back plate to remove. Do not remove these screws.

Do not replace the back plates until the Drive Electrical Interconnection Process is complete (See <u>Drive Electrical Interconnection (For IEC) on page 95</u>).

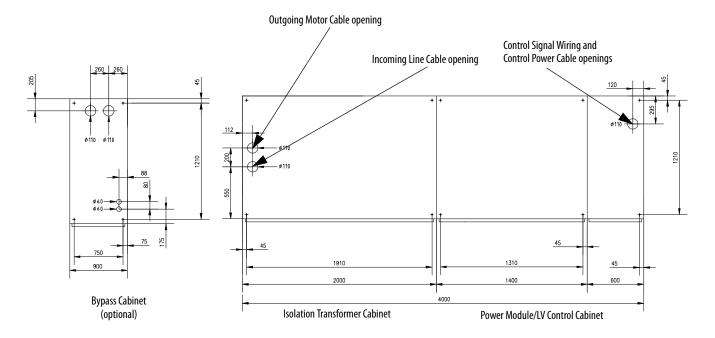
To replace the back plates, the two remaining screws orient and hold the back plate in place while fastening the other screws holding the back plates to the frame of the cabinet. Tighten these screws last to complete the process.



Affix Cabinets to Floor

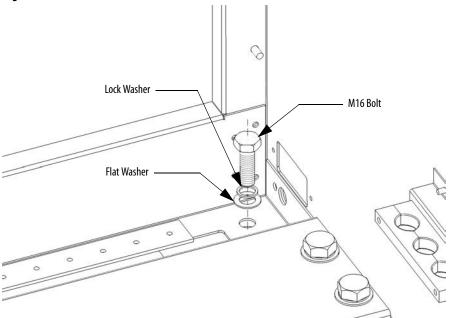
Typical floor drawings show minimum clearance distance, conduit openings, and mounting holes for anchor bolts⁽¹⁾, as shown in <u>Figure 33</u>. Refer to project-specific Dimensional Drawings for actual locations.

Figure 33 - Typical Floor Drawing (Fixed-mounted Power Module Configuration)



Secure the cabinet to the channel steel base using M16 bolt, lock washer, two flat washers and a nut.

Figure 34 - Bolt Cabinet to Steel Base

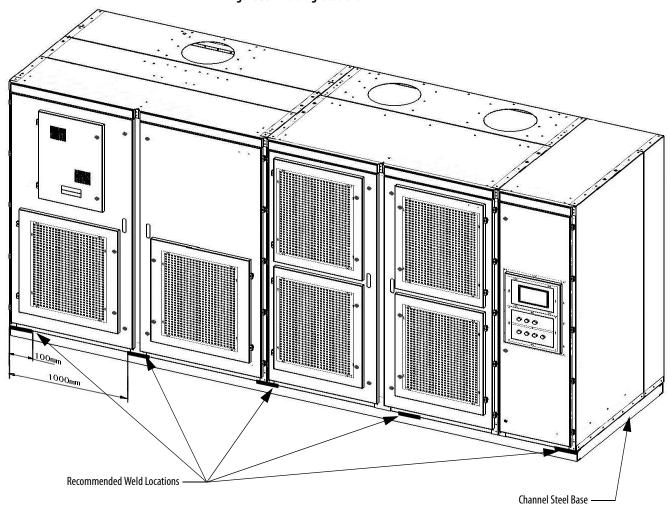


⁽¹⁾ Mounting holes are represented as + in Figure 33.

Optional: The cabinet can also be welded to the steel base once it is securely bolted, if desired.

Each weld location should be 100 mm (3.9 in.) for every 1000 mm (39.4 in.). See Mounting Requirements on page 18 for further information on the steel base and desired trench and mounting specifications.

Figure 35 - Welding locations





ATTENTION: Failure to correctly anchor the cabinet may result in damage to the equipment or injury to personnel.

Install Main Cooling Fans

Main cooling fans are shipped in separate crates (<u>Table 1</u>). The fans are shipped assembled in the fan housing, but must be installed after siting the drive.

Most drive configurations will have two to five fans. Higher power configurations will have a higher number of fans. See <u>PowerFlex 6000 Dimensions and Weights</u> (For IEC) on page 123 for fan quantities and dimensions.

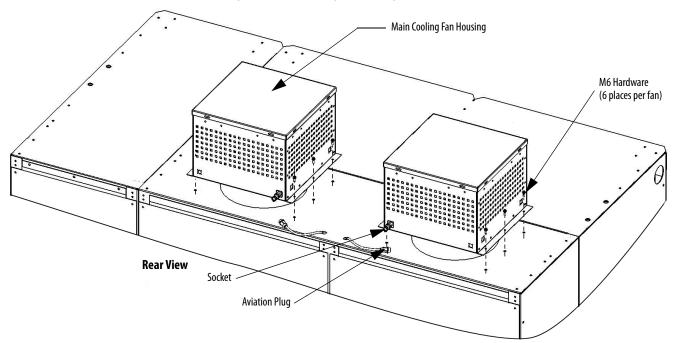
IMPORTANT See <u>Mounting Clearance Distance on page 18</u> to verify that the fans have the appropriate clearance distance on top of the cabinet.

Table 11 - Fan Housing Specifications

Model Dimensions (HxWxD), approx.		Weight, approx.
RH40M	330 x 440 x 500 mm (13.0 x 17.3 x 19.7 in.)	20 kg (44.1 lb)
RH45M	370 x 490 x 550 mm (14.6 x 19.3 x 21.7 in.)	25 kg (55.1 lb)

- 1. Place the fan housing on the top plate of the drive, making sure the socket is on the same side as the aviation plug.
- 2. Secure the fan housing using M6 hardware (6 places). See <u>Torque Requirements on page 119</u>.
- **3.** Connect the aviation plug located on top of the cabinet with the socket on the fan housing.

Figure 36 - Main Cooling Fan Housing



Install Drawout Power Modules (if applicable)

Power Modules are available in a wide variety of amperage ratings relating to the required motor current. Power Modules rated up to and including 200 A are fixed-mounted in the drive and ship already installed.

Drawout power modules are supplied for a drive current rating of >200 A. The power modules are shipped separately and must be installed in the cabinet. A Power Module lift cart is included and shipped together with the other components.

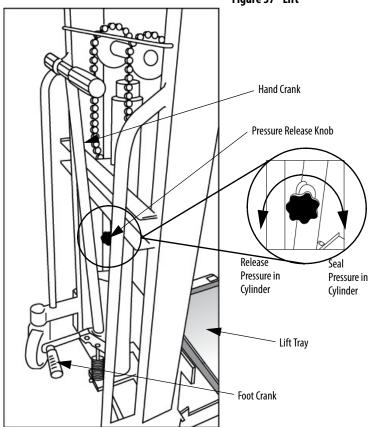
Power Module Lift Cart



ATTENTION: Only authorized personnel should operate the lift cart. Keep hands and feet away from the lifting mechanism. Do not stand under the lift tray when in use. Store the lift cart with the tray fully lowered.

Lift Carts are supplied and shipped separately with drawout power module configurations. The unit's hydraulic cylinder can be operated by either a hand or foot crank. The lifting capacity is 1000 kg (2206 lb).

Figure 37 - Lift



- 1. Visually inspect the lift cart to ensure it is fully operational.
- **2.** Turn the Pressure Release Knob clockwise until tight.
- **3.** Raise the lift tray using the Hand Crank or the Foot Crank.
 - TIP The Foot Crank raises the lift tray faster than the Hand Crank. Use this to raise the Power Module to just below the tray assembly in the drive. Use the Hand Crank for final precise positioning.
- **4.** Lower the lift tray by turning the Pressure Release Knob counter-clockwise.

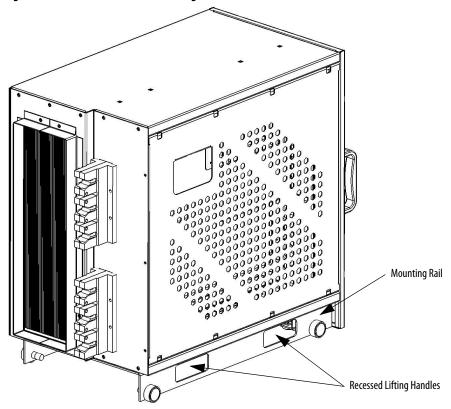
Table 12 - Power Module Specifications

Туре	Output Rating (Amps)	Dimensions (HxWxD), approx.	Weight, approx.
Fixed-mounted	≤150 A	420 x 180 x 615 mm (16.5 x 7.1 x 24.2 in.)	20 kg (44.1 lb)
	151200 A	420 x 260 x 615 mm (16.5 x 10.2 x 24.2 in.)	25 kg (55.1 lb)
Drawout	201380 A	575 x 342 x 691 mm (22.6 x 13.5 x 27.2 in.)	40 kg (88.2 lb)
	381420 A	575 x 342 x 910 mm (22.6 x 13.5 x 35.8 in.)	50 kg (110.2 lb)



ATTENTION: Two people are required to handle the Power Modules. Always handle the drawout Power Modules using the two recessed lifting handles on both mounting rails (Figure 38).

Figure 38 - Drawout Power Module Lifting Handles

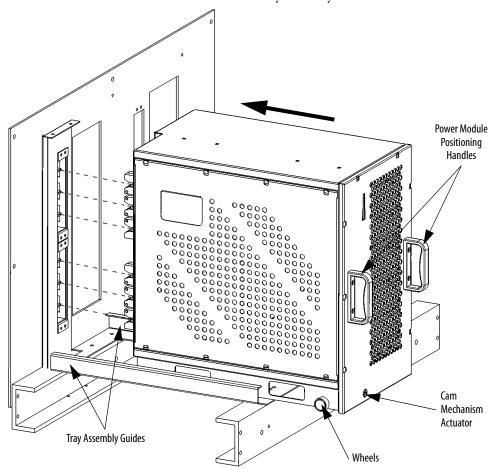




ATTENTION: Do not use the front mounted positioning handles for lifting the Power Modules. They are designed to position or withdraw the Power Module when on the tray assembly.

Install Power Modules

- 1. Place the Power Module module on the lift cart.
 - Ensure the Power Module is properly oriented; the finger assemblies must face towards the drive.
- 2. Position the lift cart in front of the cabinet and raise the Power Module to the proper height.
- **3.** Align the wheels on the Power Module with the tray assembly guides on each side of the Power Module tray assembly.



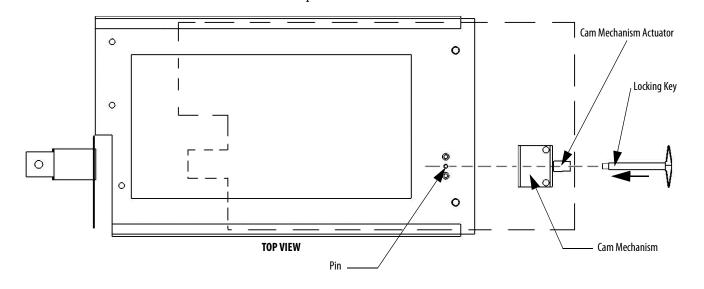
4. Push the Power Module slowly backwards into the cabinet until the cam mechanism contacts the pin mounted on the tray assembly.

Cabinet Finger Stab Assemblies Assemblies Connection to Motor Phase Bus Three Phase Cam Mechanism **Input Power** from Isolation Transformer Locking Key **SIDE VIEW**

5. Insert the locking key into the cam mechanism actuator and rotate clockwise while gently pushing on the face of the Power Module.

The cam mechanism will catch the pin on the tray assembly.

6. Continue rotating the locking key until the Power Module is fully seated. This ensures the finger assemblies at the back of the Power Module are fully connected to the stab assemblies at the back of the Power Module compartment.





ATTENTION: The Power Module finger assemblies must be fully seated on the cabinet stab assemblies.

External Ducting

The PowerFlex 6000 design can accommodate ducting exhaust air outside of the control room.



ATTENTION: The Isolation Transformer Cabinet and the Power Module/LV Control Cabinet must be ducted separately.

The following requirements are mandatory design requirements for systems that will externally duct the exhaust air and draw cleansed outside air:

- External ducting including an external filtering system must not add more than 50 Pa (0.2 in. of water) pressure drop to the PowerFlex 6000 drive air flow system. Ensure a minimum top clearance of 1000 mm (39.4 in.) above the drive top plate.
- The control room must provide slightly more make-up air, creating a
 pressurized room. This slight pressurization prevents unfiltered air
 drawing into the room.
- The drive is intended to operate in conditions with no special precautions to minimize the presence of sand or dust, but not in close proximity to sand or dust sources. IEC 721-1 defines this as being less than 0.2 mg/m³ of dust.
- If outside air does not meet this condition, filter the air to EU EN779
 Class F6 or ASHRAE Standard 52.2 MERV 11. These ratings address a
 high percentage of the 1.0...3.0 μm particle size. Clean or change filters
 regularly to ensure proper flow.
- The make-up air must be between 0...40 °C (32...104°F).
- Relative humidity must be less than 90% non-condensing.
- If the ducting length is greater than 3 m, an axial fan must be installed at the air outlet. The exhaust flow of the axial fan must be greater than the total flow amount of all the centrifugal fans in this air duct.
- The ducting must not be shared by the two cabinets.
- The distance from each side of the hood to the corresponding side of the fan must not be less than 60 mm (2.4 in.).
- Do not cover any medium voltage or control power wires which enter or exit from the top of the cabinet.
- The air duct outlet must slope downward to prevent water damage.
- Screens must be installed in the air duct outlet.

- An air inlet must be added to the drive room. The cross-sectional area of this inlet must meet the ventilation requirements of all drives. Screens must be installed in the air inlet.
- The air inlet must be at least 1000 mm (39.4 in.) above the floor.
- The air inlet and outlet must not be at the same side of the drive room.

Air Conditioning Sizing

If the drive is located in an enclosed space, install air conditioners for each drive. A general formula to calculate air conditioner power required:

$$\frac{DriveRating(kW) \times (1 - DriveEfficiency)}{3.5} = Air Conditioning Size (tons)$$

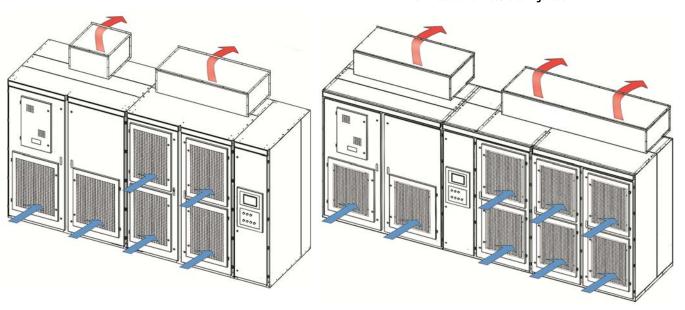
EXAMPLE For a 1000 kW drive with 96.5% efficiency:
$$\frac{1000 \times (1 - 0.9\dot{6}5)}{3.5} = 10 \text{ tons of AC required}$$

This is for a general estimate. Refer to the actual heat loss data to calculate air conditioning sizing. Contact the local Rockwell Automation office for actual data.

Figure 39 - Airflow for Fixed-mounted and Drawout Cabinet Configurations⁽¹⁾

Fixed-mounted Power Module Configuration

Drawout Power Module Configuration



⁽¹⁾ Top ducting shown by contractor.

Notes:

Drive Mechanical Installation (For UL)

Introduction

The installation process is divided into three principal activities. The mechanical installation process described in this chapter, the electrical installation process described in <u>Drive Electrical Installation (For UL) on page 81</u>, and the electrical interconnection process described in <u>Drive Electrical Interconnection (For UL) on page 107</u>.

Mechanical Installation Summary

The cabinets must be arranged as shown in the Dimensional Drawing.

Connect Shipping Splits	<u>59</u>
Affix Cabinets to Floor	<u>62</u>
Install Main Cooling Fans	<u>64</u>
Air Conditioning Sizing	<u>65</u>

Follow all applicable guidelines for siting the components before continuing with these installation instructions.

There may be some variation in the process depending on the type and number of drive components in your particular installation.

Connect Shipping Splits



ATTENTION: Install the drive on a level surface (+/- 1 mm per meter [+/- 0.036 in. per 36 in.] of drive length in all directions). If necessary, use metal shims to level the cabinets before joining them; attempting to level after joining may twist or misalign the cabinets.

The PowerFlex 6000 drive is shipped in two sections, the Isolation Transformer Cabinet and Power Module/LV Control Cabinet. These two cabinets must be connected after located in its final position. The cabinets are connected together in 10 places, five along the front edge of the cabinet and five along the rear edge of the cabinet. Access to the interior of the cabinet is required to make these connections. Access for the front connections requires only opening the doors. Access for the rear connections requires removing the back plates of the cabinet.

IMPORTANT Rear access to all cabinets is required for subsequent processes. Do not reinstall back plates until after the conclusion of the Drive Electrical Interconnection process.

1. Arrange the sections as directed in the Dimensional Drawings and move the sections together.

2. Align the cabinet side sheets together at the holes for the hardware (see step 3).

Figure 40 - Aligning Cabinets with Fixed-mounted Power Modules (6.0/6.3/6.6 kV shown)

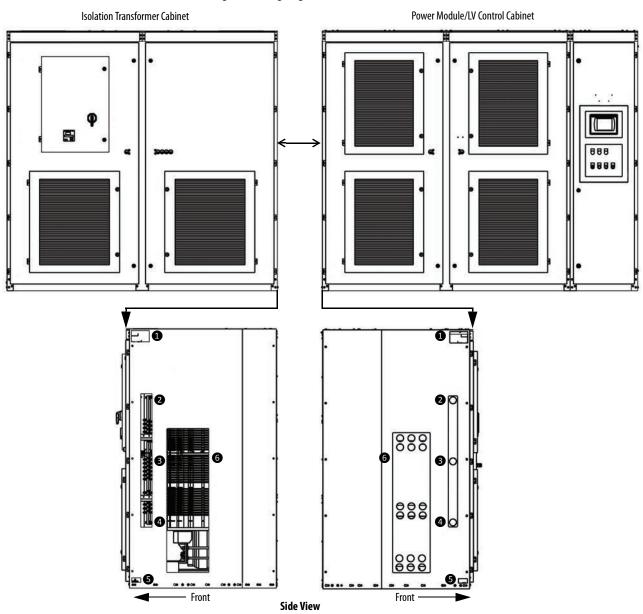


Table 13 - Sidesheet Openings

0	Front Wireway	4	W Phase Motor Cable
2	U Phase Motor Cable	6	Ground Bus Connection
8	V Phase Motor Cable	6	Isolation Transformer Secondary Cables ⁽¹⁾

⁽¹⁾ The number of Isolation Transformer secondary cables is dependent on motor voltage class.

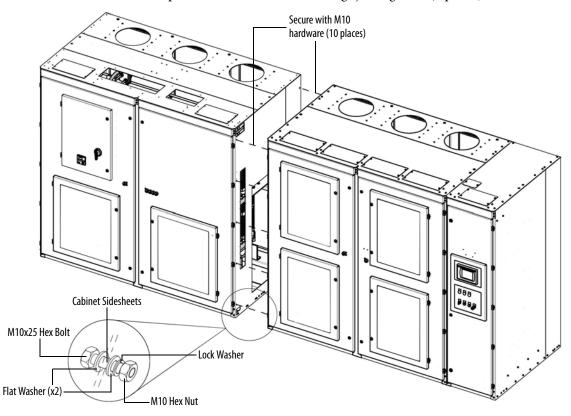
^{• 9} cables per motor phase (27 total) for 2.3/2.4 kV

^{•12} cables per motor phase (36 total) of 4.0/4.16 kV

^{• 18} cables per motor phase (54 total) for 6.0/6.3/6.6 kV

3. Secure the cabinets together using M8 hardware. See <u>Torque</u> Requirements on page 119 for proper torque requirements.

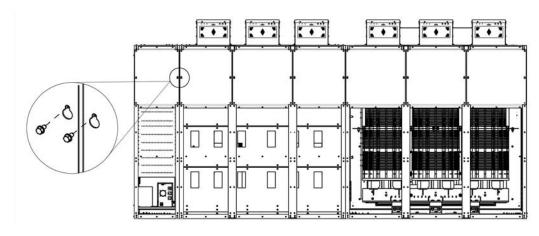
Open the doors to access front edge joining holes (5 places).



- **4.** Remove all back plates to access rear edge joining holes (5 places).
 - TIP Each back plate will have two keyhole screw holes on either side. Remove all of the other screws first. Loosen the two screws in the keyhole screw holes last and lift the back plate to remove. Do not remove these screws.

Do not replace the back plates until the Drive Electrical Interconnection Process is complete (See <u>Drive Electrical Interconnection (For UL) on page 107</u>).

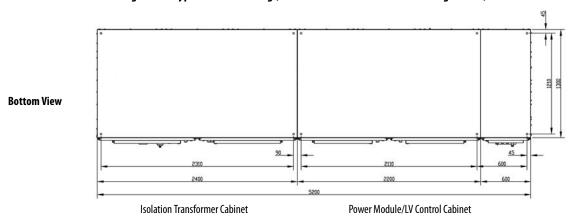
To replace the back plates, the two remaining screws orient and hold the back plate in place while fastening the other screws holding the back plates to the frame of the cabinet. Tighten these screws last to complete the process.



Affix Cabinets to Floor

Typical floor drawings show minimum clearance distance, conduit openings, and mounting holes for anchor bolts⁽¹⁾, as shown in <u>Figure 41</u>. Refer to project-specific Dimensional Drawings for actual locations.

Figure 41 - Typical Floor Drawing (Fixed-mounted Power Module Configuration)



Top View

Control Signal Wiring and Control Power Cable openings

Top View

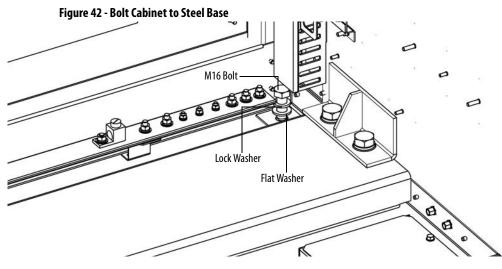
Isolation Transformer Cabinet

Control Signal Wiring and Control Power Cable openings

Control Power Cable openings

Power Module/LV Control Cabinet

Secure the cabinet to the channel steel base using M16 bolt, lock washer, two flat washers and a nut.

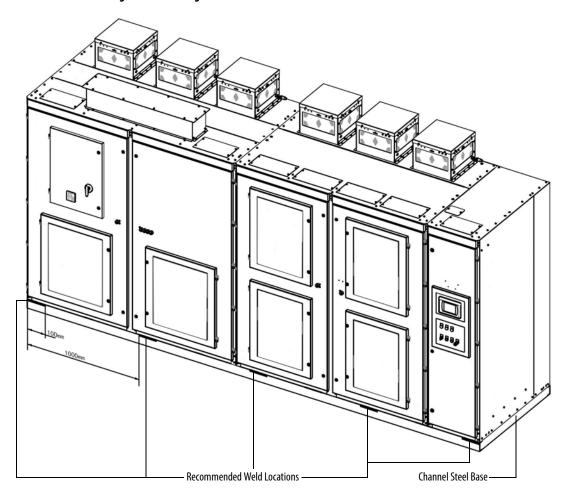


(1) Mounting holes are represented as + in Figure 41.

Optional: The cabinet can also be welded to the steel base once it is securely bolted, if desired.

Each weld location should be 100 mm (3.9 in.) for every 1000 mm (39.4 in.). See Mounting Requirements on page 34 for further information on the steel base and desired trench and mounting specifications.

Figure 43 - Welding locations





ATTENTION: Failure to correctly anchor the cabinet may result in damage to the equipment or injury to personnel.

Install Main Cooling Fans

Main cooling fans are shipped in separate crates (<u>Table 5</u>). The fans are shipped assembled in the fan housing, but must be installed after siting the drive.

Most drive configurations will have two to five fans. Higher power configurations will have a higher number of fans. See <u>PowerFlex 6000 Dimensions and Weights</u> (<u>For UL</u>) on page 131 for fan quantities and dimensions.

IMPORTANT See <u>Mounting Clearance Distance on page 34</u> to verify that the fans have the appropriate clearance distance on top of the cabinet.

Table 14 - Fan Housing Specifications

Model	Dimensions (HxWxD), approx.	Weight, approx.
RH40M	340 x 440 x 500 mm (13.4 x 17.3 x 19.7 in.)	20 kg (44.1 lb)
RH45M	380 x 490 x 550 mm (15.0 x 19.3 x 21.7 in.)	25 kg (55.1 lb)

- 1. Place the fan housing on the top plate of the drive, making sure the socket is on the same side as the aviation plug.
- 2. Secure the fan housing using M6 hardware (6 places). See Torque Requirements on page 119.
- **3.** Connect the aviation plug located on top of the cabinet with the socket on the fan housing.

Figure 44 - Main Cooling Fan Housing

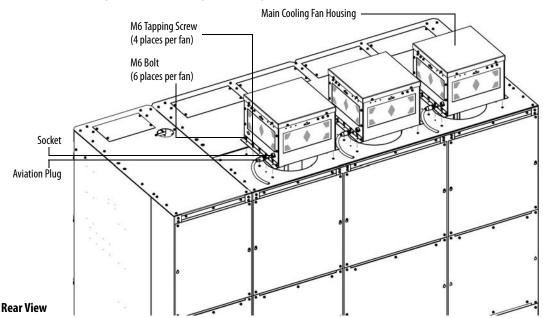


Table 15 - Power Module Specifications

Туре	Output Rating (Amps)	Dimensions (HxWxD), approx. Weight, a	
Fixed-mounted	≤150 A	420 x 182 x 597 mm (16.5 x 7.2 x 23.5 in.)	30 kg (66.1 lb)
	151200 A	420 x 260 x 619 mm (16.5 x 10.3 x 24.4 in.)	50 kg (110.2 lb)

Air Conditioning Sizing

If the drive is located in an enclosed space, install air conditioners for each drive. A general formula to calculate air conditioner power required:

$$\frac{DriveRating(kW) \times (1 - DriveEfficiency)}{3.5} = Air Conditioning Size (tons)$$

EXAMPLE For a 1000 kW drive with 96.5% efficiency:
$$\frac{1000 \times (1 - 0.965)}{3.5} = 10 \text{ tons of AC required}$$

This is for a general estimate. Refer to the actual heat loss data to calculate air conditioning sizing. Contact the local Rockwell Automation office for actual data.

Notes:

Drive Electrical Installation (For IEC)

Introduction

The installation of all external power cables and control signal wiring is covered in this chapter. General electrical safety and installation guideline topics are also included. The basic activities include connecting the system ground cable, line and motor cables, control power, and all control signal wiring from the sources to the drive. See Figure 83 and Figure 84 for an overview of these connections.

Electrical interconnections are also required between cabinets that have shipped separately. These are described in <u>Drive Electrical Interconnection (For IEC) on page 95</u>.

Safety and Codes



SHOCK HAZARD: Connecting to potentially energized industrial control equipment can be dangerous. Severe injury or death can result from electrical shock, burn, or unintended actuation of control equipment. Hazardous voltages may exist in the cabinet even with the circuit breaker in the off position. Required practice is to disconnect and lock out control equipment from power sources, and confirm discharge of stored energy in capacitors. If it is necessary to work in the vicinity of energized equipment, the safety related work practices outlined in Electrical Safety requirements for Employee Work places must be followed. Before attempting any work, verify the system has been locked out and tested to have no potential.

Lockout and tagout the input circuit breaker before performing any electrical connection work. After the input circuit breaker cabinet doors are opened, immediately test the outgoing connections and any components connected to medium voltage with a live-line tool (hot stick) while wearing high voltage gloves. Pay special attention to any capacitors connected to medium voltage that can retain a charge for a period of time. Only after the equipment has been verified as isolated and de-energized can subsequent work be performed. Even though the input to the drive may be open, it is still possible for hazardous voltage to be present.

Refer to national and local safety guidelines for detailed procedures on how to safely isolate the equipment from hazards.

67



ATTENTION: The national and local electrical codes outline provisions for safely installing electrical equipment. Installation must comply with specifications regarding wire type, conductor sizes, branch circuit protection and disconnect devices. Failure to do so may result in personal injury and/or equipment damage.

Electrical Drawings

Before connecting any power cables or control signal wiring, review and understand the information contained in the project-specific Electrical Drawings.

They contain critical information such as:

- Minimum power cable insulation ratings and sizes
- Power terminal locations and designations
- Terminal block designations for all connections to external customer control signal wiring and control power supply cables.

The practice used within the PowerFlex 6000 electrical drawing is based on the IEC (International Electrotechnical Commission) standard. The symbols used to identify components on the drawings are international.

Device designations used on the drawings and labeling are explained on each drawing set.

Wiring identification uses a source/destination wire number convention on point-to-point multi-conductor wiring and in situations where the system is warranted. The wire-numbering system of unique, single numbers for multi-drop and point-to-point wiring continues to be used for general control and power wiring.

Wiring that connects between the sheets or that ends at one point and starts at another point on a drawing has an arrow and drawing reference to indicate the ongoing connection. The drawing reference indicates the sheet and the X/Y coordinates of the continuation point. The reference system is explained on a sheet in each drawing set. The unique wire numbering system serves as confirmation that the correct wire is being traced from sheet-to-sheet or across a drawing. Wires in multi-conductor cables are typically identified by color rather than by number. Abbreviations used to identify the colors on the drawings are fully identified on a sheet in the drawing set.

Grounding System Requirements

As a general guideline, the ground path must be of sufficiently low impedance and capacity that:

 the rise in potential of the drive ground point when subjected to a current of twice the rating of the supply should be no higher than 4 V over ground potential • the current flowing into a ground fault is of sufficient magnitude to cause the protection to operate.

The general grounding point must be reliably connected with the grounding network.

Attach an external ground cable to the main ground bus, in compliance with applicable national and local electrical codes.

IMPORTANT	The primary grounding cable must have a diameter of at least 50 mm ² and
	meet all applicable national and local electrical codes.

Run the system ground cable separately from power and signal wiring so that faults:

- do not damage the grounding circuit
- will not interfere with or damage the protection or metering systems, or cause undue disturbance on power lines.

Power Cable Insulation Requirements

Incoming line power cable ratings are shown on the Electrical Drawings and reflect what would typically be supplied, based on line voltage rating.

All voltage ratings for outgoing motor cables shown are line-to-ground rated power-frequency voltages and line-to-line power-frequency voltages.

Table 16 - Cable Insulation Requirements for Outgoing Motor Cables

Custom Voltago	Cable Insulation Rating (kV) - Motor Side		
System Voltage (V, RMS)	Line-to-Ground Rated Power Frequency Voltage U _o	Line-to-Line Rated Power Frequency Voltage U	
3000	≥3.6	≥6	
3300	≥3.6	≥6	
6000	≥6.0	≥10	
6600	≥6.0	≥10	
10,000	≥8.7	≥15	

Select cables of appropriate voltage classes when the incoming line grid-side voltage class is different from the outgoing line motor-side voltage class.

Standard power cable ratings commercially available can vary in different regions around the world. Cable must meet the minimum line-to-ground and line-to-line requirements.

IMPORTANT	Follow the recommended field power cabling insulation levels to help ensure trouble-free start-up and operation. The cable insulation level must be
	increased over that which would be supplied for an across-the-line application with the same rated line-to-line voltage.

Power Cable Design Considerations

Use fire retardant cables for the drive input/output connections.

Shielded or unshielded cable can be used based on the criteria considered by the distribution system designer and national and local electrical codes.

If shielded power cables are used, connect the shield of the main input/output power cables with the general grounding point of the drive. Ground the drive output protective grounding connection separately, and only at the drive side.

Comply with the maximum tensile stress and the minimum curvature radius recommended by the cable manufacturer.

Do not bundle the input/output cables of the drive together.

The power cable tray must not be less than 300 mm (12 in.).

There must be no gaps where the conduit connects to the cabinet and the ground bond must be less than 0.1 ohms. Spacing between wire groups is the recommended minimum for parallel runs of approximately 61 m (200 ft) or less.

IMPORTANT

The power cable distance from the drive to the motor must not be longer than 300 m. If the power cable exceeds 300 m, contact the factory. Configurations can be provided for longer cable distances, but must be specified at the time of order.

All input and output power wiring, control wiring or conduit must be brought through the conduit entrance holes of the cabinet. Use appropriate connectors to maintain the environmental rating of the cabinet.

Motor Cable Sizing

Voltage drop in motor leads may adversely affect motor starting and running performance. Installation and application requirements may dictate that larger wire sizes than indicated in national and local electrical codes are used.

Wire sizes must be selected individually, observing all applicable safety and national and local electrical codes. The minimum permissible wire size does not necessarily result in the best operating economy. The minimum recommended size for the wires between the drive and the motor is the same as that used if a main voltage source connection to the motor was used. The distance between the drive and motor can affect the size of the conductors used.

Consult the Electrical Drawings and appropriate national and local electrical codes to determine correct power wiring. If assistance is needed, contact your local Rockwell Automation Sales Office.

Control Signal Wiring Design Considerations

Use shielded cables for all the analog and digital control cables.

Steel conduit or a cable tray can be used for all PowerFlex 6000 drive power or control wiring; however, use only steel conduit for all signal wiring.



ATTENTION: Steel conduit is required for all control and signal circuits when the drive is installed in European Union countries.

Wires for digital and analog signals must be routed separately.

Control cables and power cables must be routed separately; the distance between the control cable tray and the power cable tray must not be less than 300 mm.

If the control cable must pass through the power cable tray, the angle between the cable trays must be as close to 90° as possible.

Do not mix AC and DC wires in the same cable bundle.

General Wire Categories on page 121 identifies general wire categories for installing the PowerFlex 6000 drive. Each category has an associated wire group number that is used to identify the required wire. Application and signal examples, along with the recommended type of cable for each group, are provided. A matrix providing the recommended minimum spacing between different wire groups which run in the same tray or in a separate conduit is also provided.

Control Signal Wire Shield Grounding

Guidelines for Drive Signal and Safety Grounds: when using interface cables carrying signals, where the frequency does not exceed 1 MHz, for communications with the drive, follow these general guidelines:

- Ground screen mesh around the entire circumference, rather than forming a pigtail grounded only at one point.
- For coaxial cables with a single conductor surrounded by a mesh screen, ground the screen at both ends.
- When using a multi-layer screened cable (that is, a cable with both a mesh screen and a metal sheath or some form of foil), there are two alternative methods:
 - Ground the mesh screen at both ends to the metal sheath. The metal sheath or foil (known as the drain) should, unless otherwise specified, be grounded at one end only, again, as specified above, at the receiver end or the end that is physically closest to the main equipment ground bus
 - Leave the metal sheath or foil insulated from ground, and ground the other conductors and the mesh cable screen at one end only, as stated above.

Grounding provisions for control signal wiring is shown in Figure 45.

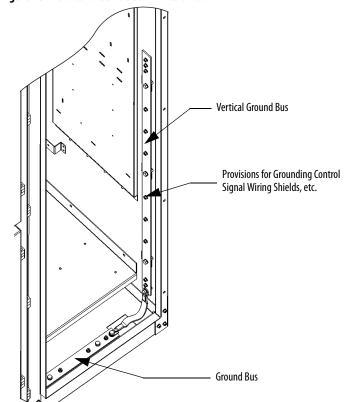


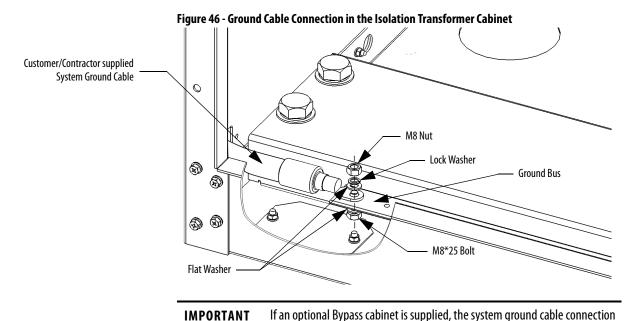
Figure 45 - Vertical Ground Bus in LV Cabinet

Electrical Installation Summary

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Connect the System Ground Cable	<u>73</u>
Megger Test of Power Cables	<u>73</u>
Connect Incoming Line and Outgoing Motor Power Cables	<u>73</u>
Connect Control Power Wiring	<u>76</u>
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Connect Electrical Safety Interlock Circuit to Input Circuit Breaker	<u>79</u>

Connect the System Ground Cable

The drive ground bus runs along the bottom of the drive at the front. The ground bus is accessible at the bottom of the front of each drive cabinet when the cabinet door is opened. Connect the system ground cable to the drive ground bus (Figure 46).



Megger Test of Power Cables

Before connecting the incoming line and outgoing motor power cables, follow standard industry practice to verify the integrity of the power cable insulation from the input breaker to the drive and from the drive to the motor.

is in the Bypass cabinet. Refer to publication 6000-UM002_-EN-P.

Connect Incoming Line and Outgoing Motor Power Cables

The installer must ensure that all power connections are in accordance with national and local electrical codes.

Each drive is equipped with provisions for bottom power cable entry as standard. Provisions for top power cable entry can also be provided. This must be specified at the time of order.

Cable access openings are located on the bottom plate of the connection cabinet identified by the customer specific Dimension Drawing.

Outgoing Motor Cables
Incoming Line Cables

Figure 47 - Power Cable Entry Locations in the Isolation Transformer Cabinet

The drive is supplied with the following provisions for power cable lugs.

Table 17 - Power Terminals

Incoming Line Cable Connections	L11	L12	L13
Outgoing Motor Cable Connections	U	V	W

IMPORTANT	If an optional Bypass cabinet is supplied, the incoming line and outgoing motor cable connections are in the Bypass cabinet. Refer to publication 6000-UM002EN-P.

<u>Figure 48</u> shows typical connection points for the primary entrance/exit cable.

Connect the three-phase medium voltage inputs L11, L12, and L13 to the user-provided input three-phase AC power.

Connect three-phase medium voltage inputs U, V, and W to the user-provided three-phase asynchronous motor.

Cable clamps are provided in the cabinet to aid in routing and supporting the incoming line and outgoing motor power cables.

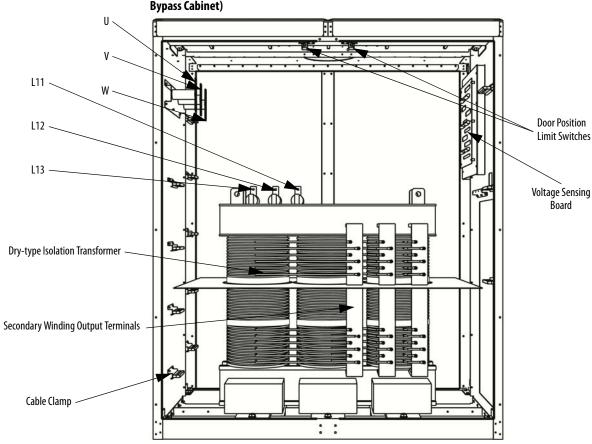
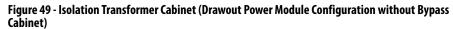
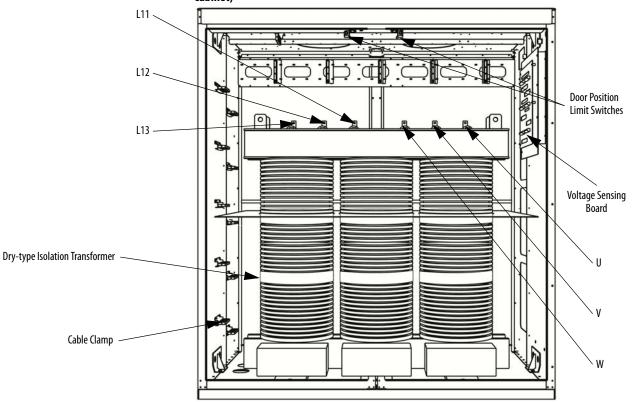


Figure 48 - Isolation Transformer Cabinet (Fixed-mounted Power Module Configuration without Bypass Cabinet)





Connect Control Power Wiring

Introduction

Externally supplied control power is required to operate the drive. The standard voltage supported is 220V AC/50 Hz. The other typical phase voltages of 230V AC, 110V AC, and 120V AC are also supported (50/60 Hz), but need to be specified at the time of order. A minimum of 3 kVA is required to supply the control circuit.

Wiring Routing and Connection

The control power wiring enters the drive through an opening in the bottom plate of the LV Control Cabinet.

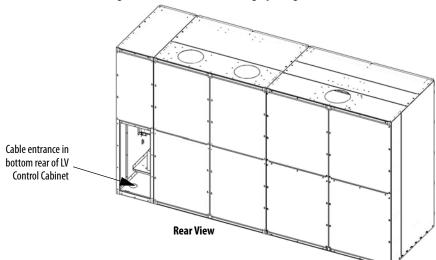
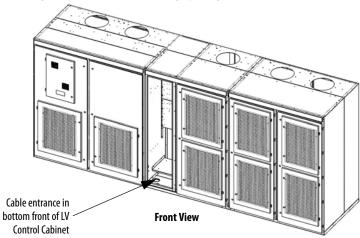


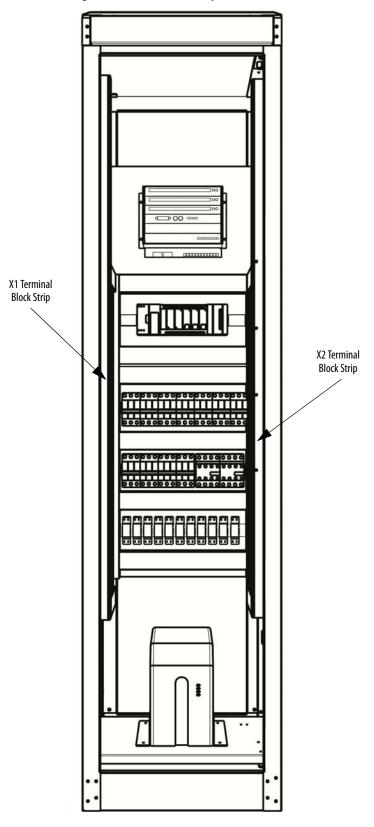
Figure 50 - Control Power Wiring Opening (Fixed-mounted Power Module Configuration)





The control power wiring terminates to the X1 terminal block strip on the left side of the LV Control cabinet (<u>Figure 52</u>). See <u>Figure 83</u> or <u>Figure 84</u> for general overview. Refer to Electrical Drawings for actual connection points.

Figure 52 - Terminal Block Strip locations



Connect External Control Signal Wiring

Introduction

This section summarizes the control signal wiring from the remote DCS/PLC or discrete control to the drive. General connections are detailed in Power Cabling and Control Signal Wiring Details (For IEC) on page 145. Refer to the Electrical Drawings for connection information specific to the drive being installed.

Analog and Digital I/O Overview

Four 4...20 mA analog input signals. One may be used for DCS with rotating speed setting and three for backup. For detailed information, see <u>Table 57</u> and <u>Table 58 on page 149</u>.

Two 4...20 mA analog output signals for indication signals such as output motor current and frequency. See <u>Table 57</u> and <u>Table 58 on page 149</u>.

Sixteen passive dry contact inputs (internal 24V DC power supply) start/stop and reset controls. For detailed information, see <u>Table 57</u> and <u>Table 58 on page 149</u>. These inputs are scalable depending on user requirements.

Twenty dry contact outputs: including nine active dry contact outputs with a capacity of not more than 20W for indication (backup), and 11 passive dry contact outputs powered by the drive with a capacity of 220V AC/5A for DCS status/fault indication. For detailed information, see <u>Table 57</u> and <u>Table 58 on page 149</u>. These outputs are scalable depending on user requirements.

The drive is provided with dry contact outputs (1 N.O. with a capacity of 220V AC/5 A, valid when closed) which trigger the user-provided medium voltage circuit breaker for interlock with the user-provided medium voltage switch cabinet. For detailed information, see <u>Table 57</u> and <u>Table 58 on page 149</u>.

Ethernet interface is supplied as standard (other communication interfaces including Modbus and Profibus are provided as options). For detailed information, see Figure 86 on page 148.

Wiring Routing and Connection

The control signal wiring enters the drive through the same opening as the control power wiring in the LV Control Cabinet (Figure 50 or Figure 51).

The wiring terminates either to the X1 or X2 terminal block strips on either side of the LV Control cabinet (<u>Figure 52</u>). See <u>Figure 83</u> or <u>Figure 84</u> for general information. Refer to Electrical Drawings for actual connection points.

Connect Electrical Safety Interlock Circuit to Input Circuit Breaker

Introduction

The electrical safety interlock circuit is part of the overall control signal wiring activity. However, it is mentioned separately in this document due to its critical importance related to the safe operation of the drive and personnel safety.

The circuits connected between the drive and the input circuit breaker:

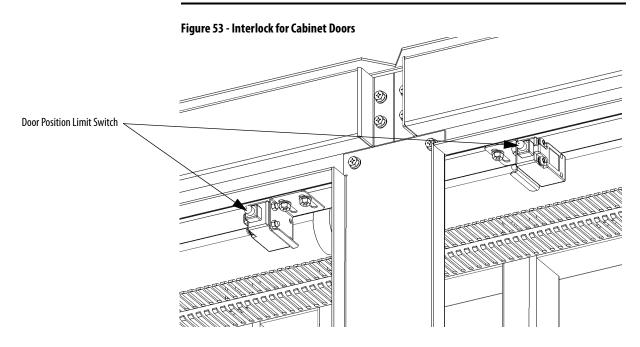
- allow the drive to trip the input circuit breaker if a drive cabinet door is opened. This applies to the cabinet doors where medium voltage is present. The LV Control cabinet door can be opened while the drive is energized.
- allow the drive to prevent the input circuit breaker from closing when required.
- indicate to the drive when the input circuit breaker is closed.

MV Door Safety Interlock

If the MV cabinet door is opened, the Allen-Bradley Guardmaster Limit Switch (440P-CRPS11D4B) on the cabinet door will actuate. The drive will send a trip signal to the input circuit breaker to disconnect the medium voltage power supply to the drive.



ATTENTION: The door position interlock is a safety feature. It must not be used solely as a part of the plant operation process to ensure the drive has been disconnected from input medium voltage. Keep the medium voltage doors locked as standard practice. Always go to the input circuit breaker feeding the drive to verify if it is open. Lock out and tagout the input circuit breaker before performing any work on the drive or bypass units.



When the doors of the Power Module/LV Control Cabinet or Isolation Transformer Cabinet are not closed, when the drive is being maintained or when the control power switch is not closed, the drive will not send a signal allowing the input circuit breaker to close; this is wired as a permissive contact in the input circuit breaker's closing circuit so that the input circuit breaker cannot close.

Wire Routing and Connection

The electrical safety interlock control signal wiring enters the drive through the same opening as the control power wiring in the bottom of the LV Control Cabinet (Figure 50 or Figure 51).

The wiring terminates to the X1 terminal block strip on the right side of the LV Control cabinet (Figure 52). See Figure 83 or Figure 84 for general information. Refer to Electrical Drawings for actual connection points.

Drive Electrical Installation (For UL)

Introduction

The installation of all external power cables and control signal wiring is covered in this chapter. General electrical safety and installation guideline topics are also included. The basic activities include connecting the system ground cable, line and motor cables, control power, and all control signal wiring from the sources to the drive. See Figure 87 and Figure 88 for an overview of these connections.

Electrical interconnections are also required between cabinets that have shipped separately. These are described in <u>Drive Electrical Interconnection (For UL) on page 107</u>.

Safety and Codes



SHOCK HAZARD: Connecting to potentially energized industrial control equipment can be dangerous. Severe injury or death can result from electrical shock, burn, or unintended actuation of control equipment. Hazardous voltages may exist in the cabinet even with the circuit breaker in the off position. Required practice is to disconnect and lock out control equipment from power sources, and confirm discharge of stored energy in capacitors. If it is necessary to work in the vicinity of energized equipment, the safety related work practices outlined in Electrical Safety requirements for Employee Work places must be followed. Before attempting any work, verify the system has been locked out and tested to have no potential.

Lockout and tagout the input circuit breaker before performing any electrical connection work. After the input circuit breaker cabinet doors are opened, immediately test the outgoing connections and any components connected to medium voltage with a live-line tool (hot stick) while wearing high voltage gloves. Pay special attention to any capacitors connected to medium voltage that can retain a charge for a period of time. Only after the equipment has been verified as isolated and de-energized can subsequent work be performed. Even though the input to the drive may be open, it is still possible for hazardous voltage to be present.

Refer to national and local safety guidelines for detailed procedures on how to safely isolate the equipment from hazards.



ATTENTION: The national and local electrical codes outline provisions for safely installing electrical equipment. Installation must comply with specifications regarding wire type, conductor sizes, branch circuit protection and disconnect devices. Failure to do so may result in personal injury and/or equipment damage.

Electrical Drawings

Before connecting any power cables or control signal wiring, review and understand the information contained in the project-specific Electrical Drawings.

They contain critical information such as:

- Minimum power cable insulation ratings and sizes
- Power terminal locations and designations
- Terminal block designations for all connections to external customer control signal wiring and control power supply cables.

The practice used within the PowerFlex 6000 electrical drawing is based on the UL (Underwriters Laboratories) standard.

Device designations used on the drawings and labeling are explained on each drawing set.

Wiring identification uses a source/destination wire number convention on point-to-point multi-conductor wiring and in situations where the system is warranted. The wire-numbering system of unique, single numbers for multi-drop and point-to-point wiring continues to be used for general control and power wiring.

Wiring that connects between the sheets or that ends at one point and starts at another point on a drawing has an arrow and drawing reference to indicate the ongoing connection. The drawing reference indicates the sheet and the X/Y coordinates of the continuation point. The reference system is explained on a sheet in each drawing set. The unique wire numbering system serves as confirmation that the correct wire is being traced from sheet-to-sheet or across a drawing. Wires in multi-conductor cables are typically identified by color rather than by number. Abbreviations used to identify the colors on the drawings are fully identified on a sheet in the drawing set.

Grounding System Requirements

As a general guideline, the ground path must be of sufficiently low impedance and capacity that:

- the rise in potential of the drive ground point when subjected to a current of twice the rating of the supply should be no higher than 4 V over ground potential
- the current flowing into a ground fault is of sufficient magnitude to cause the protection to operate.

The general grounding point must be reliably connected with the grounding network.

Attach an external ground cable to the main ground bus, in compliance with applicable national and local electrical codes.

IMPORTANT	The primary grounding cable must have a diameter of at least 50 mm ² and
	meet all applicable national and local electrical codes.

Run the system ground cable separately from power and signal wiring so that faults:

- do not damage the grounding circuit
- will not interfere with or damage the protection or metering systems, or cause undue disturbance on power lines.

Power Cable Insulation Requirements

Incoming line power cable ratings are shown on the Electrical Drawings and reflect what would typically be supplied, based on line voltage rating.

All voltage ratings for outgoing motor cables shown are line-to-ground rated power-frequency voltages and line-to-line power-frequency voltages.

Table 18 - Cable Insulation Requirements for Outgoing Motor Cables

System Voltage	Cable Insulation Rating (kV) - Motor Side	
(RMS)	Voltage Rating	Insulation Level
2.3/2.4 kV	5	133%
4.0/4.16 kV	5	133%
6.0 kV	8	133%
6.3 kV	8	133%
6.6 kV	8	133%

Select cables of appropriate voltage classes when the incoming line grid-side voltage class is different from the outgoing line motor-side voltage class.

Standard power cable ratings commercially available can vary in different regions around the world. Cable must meet the minimum line-to-ground and line-to-line requirements.

IMPORTANT	Follow the recommended field power cabling insulation levels to help ensure
IMPURIANI	'
	trouble-free start-up and operation. The cable insulation level must be
	increased over that which would be supplied for an across-the-line application
	with the same rated line-to-line voltage.

Power Cable Design Considerations

Use fire retardant cables for the drive input/output connections.

Shielded or unshielded cable can be used based on the criteria considered by the distribution system designer and national and local electrical codes.

If shielded power cables are used, connect the shield of the main input/output power cables with the general grounding point of the drive. Ground the drive output protective grounding connection separately, and only at the drive side.

Comply with the maximum tensile stress and the minimum curvature radius recommended by the cable manufacturer.

Do not bundle the input/output cables of the drive together.

The power cable tray must not be less than 300 mm (12 in.).

There must be no gaps where the conduit connects to the cabinet and the ground bond must be less than 0.1 ohms. Spacing between wire groups is the recommended minimum for parallel runs of approximately 61 m (200 ft) or less.

IMPORTANT

The power cable distance from the drive to the motor must not be longer than 300 m. If the power cable exceeds 300 m, contact the factory. Configurations can be provided for longer cable distances, but must be specified at the time of order.

All input and output power wiring, control wiring or conduit must be brought through the conduit entrance holes of the cabinet. Use appropriate connectors to maintain the environmental rating of the cabinet.

Motor Cable Sizing

Voltage drop in motor leads may adversely affect motor starting and running performance. Installation and application requirements may dictate that larger wire sizes than indicated in national and local electrical codes are used.

Wire sizes must be selected individually, observing all applicable safety and national and local electrical codes. The minimum permissible wire size does not necessarily result in the best operating economy. The minimum recommended size for the wires between the drive and the motor is the same as that used if a main voltage source connection to the motor was used. The distance between the drive and motor can affect the size of the conductors used.

Consult the Electrical Drawings and appropriate national and local electrical codes to determine correct power wiring. If assistance is needed, contact your local Rockwell Automation Sales Office.

Control Signal Wiring Design Considerations

Use shielded cables for all the analog and digital control cables.

Steel conduit or a cable tray can be used for all PowerFlex 6000 drive power or control wiring; however, use only steel conduit for all signal wiring.



ATTENTION: Steel conduit is required for all control and signal circuits when the drive is installed in European Union countries.

Wires for digital and analog signals must be routed separately.

Control cables and power cables must be routed separately; the distance between the control cable tray and the power cable tray must not be less than 300 mm.

If the control cable must pass through the power cable tray, the angle between the cable trays must be as close to 90° as possible.

Do not mix AC and DC wires in the same cable bundle.

General Wire Categories on page 121 identifies general wire categories for installing the PowerFlex 6000 drive. Each category has an associated wire group number that is used to identify the required wire. Application and signal examples, along with the recommended type of cable for each group, are provided. A matrix providing the recommended minimum spacing between different wire groups which run in the same tray or in a separate conduit is also provided.

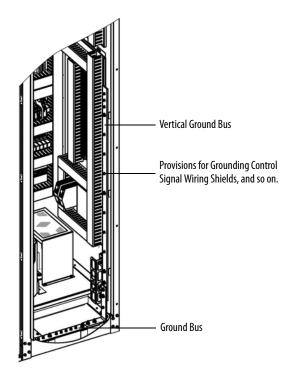
Control Signal Wire Shield Grounding

Guidelines for Drive Signal and Safety Grounds: when using interface cables carrying signals, where the frequency does not exceed 1 MHz, for communications with the drive, follow these general guidelines:

- Ground screen mesh around the entire circumference, rather than forming a pigtail grounded only at one point.
- For coaxial cables with a single conductor surrounded by a mesh screen, ground the screen at both ends.
- When using a multi-layer screened cable (that is, a cable with both a mesh screen and a metal sheath or some form of foil), there are two alternative methods:
 - Ground the mesh screen at both ends to the metal sheath. The metal sheath or foil (known as the drain) should, unless otherwise specified, be grounded at one end only, again, as specified above, at the receiver end or the end that is physically closest to the main equipment ground bus
 - Leave the metal sheath or foil insulated from ground, and ground the other conductors and the mesh cable screen at one end only, as stated above.

Grounding provisions for control signal wiring is shown in Figure 54.

Figure 54 - Vertical Ground Bus in LV Cabinet



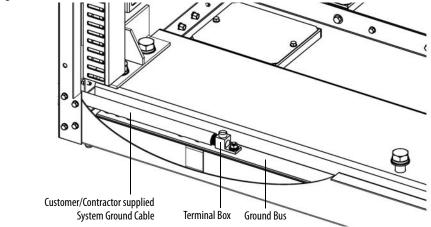
Electrical Installation Summary

Connect External Cabling and Wiring	Page
Connect the System Ground Cable	<u>87</u>
Megger Test of Power Cables	<u>87</u>
Connect Incoming Line and Outgoing Motor Power Cables	<u>87</u>
Connect Control Power Wiring	<u>89</u>
Connect External Control Signal Wiring	<u>91</u>
Connect Electrical Safety Interlock Circuit to Input Circuit Breaker	<u>92</u>

Connect the System Ground Cable

The drive ground bus runs along the bottom of the drive at the front. The ground bus is accessible at the bottom of the front of each drive cabinet when the cabinet door is opened. Connect the system ground cable to the drive ground bus (Figure 55).

Figure 55 - Ground Cable Connection in the Isolation Transformer Cabinet



IMPORTANT

If an optional Bypass cabinet is supplied, the system ground cable connection is in the Bypass cabinet. Refer to publication 6000-UM002_-EN-P.

Megger Test of Power Cables

Before connecting the incoming line and outgoing motor power cables, follow standard industry practice to verify the integrity of the power cable insulation from the input breaker to the drive and from the drive to the motor.

Connect Incoming Line and Outgoing Motor Power Cables

The installer must ensure that all power connections are in accordance with national and local electrical codes.

Each drive is equipped with provisions for bottom power cable entry as standard. Provisions for top power cable entry can also be provided. This must be specified at the time of order.

Cable access openings are located on the bottom plate of the connection cabinet identified by the customer specific Dimension Drawing.

Incoming Line Cables
Outgoing Motor Cables

Figure 56 - Power Cable Entry Locations in the Isolation Transformer Cabinet

The drive is supplied with the following provisions for power cable lugs.

Table 19 - Power Terminals

Incoming Line Cable Connections	L1	L2	L3
Outgoing Motor Cable Connections	U	V	W

If an optional Bypass cabinet is supplied, the incoming line and outgoing motor cable connections are in the Bypass cabinet. Refer to publication 6000-UM002EN-P.

Figure 57 shows typical connection points for the primary entrance/exit cable.

Connect the three-phase medium voltage inputs L1, L2, and L3 to the user-provided input three-phase AC power.

Connect three-phase medium voltage inputs U, V, and W to the user-provided three-phase asynchronous motor.

Cable clamps are provided in the cabinet to aid in routing and supporting the incoming line and outgoing motor power cables.

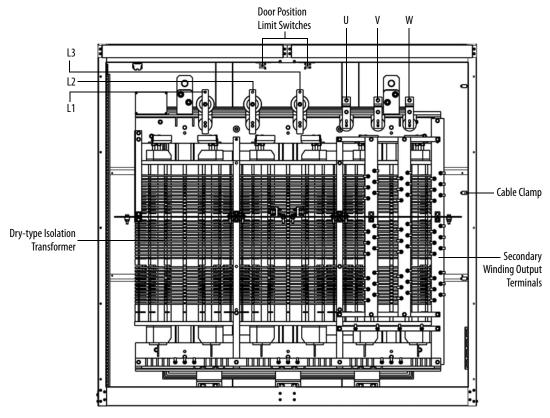


Figure 57 - Isolation Transformer Cabinet (Fixed-mounted Power Module Configuration without Bypass Cabinet)

Connect Control Power Wiring

Introduction

Externally supplied control power is required to operate the drive. The standard voltage supported is $220 \text{V} \, \text{AC}/50 \, \text{Hz}$. The other typical phase voltages of $230 \text{V} \, \text{AC}$, $110 \text{V} \, \text{AC}$, and $120 \text{V} \, \text{AC}$ are also supported ($50/60 \, \text{Hz}$), but need to be specified at the time of order. A minimum of 3 kVA is required to supply the control circuit.

Wiring Routing and Connection

The control power wiring enters the drive through an opening in the bottom plate of the LV Control Cabinet.

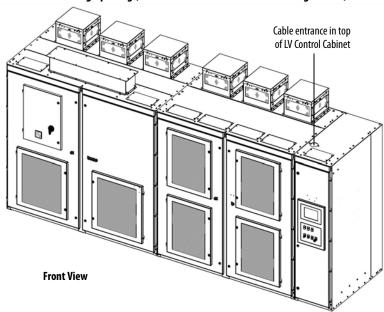
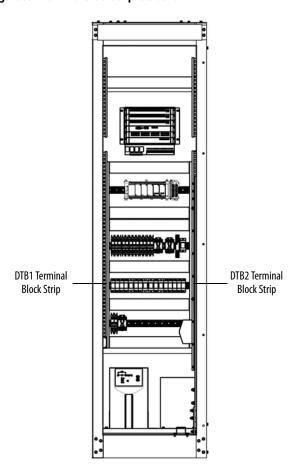


Figure 58 - Control Power Wiring Opening (Fixed-mounted Power Module Configuration)

The control power wiring terminates to the DTB1 terminal block strip on the left side of the LV Control cabinet (Figure 59). See Figure 87 or Figure 88 for general overview. Refer to Electrical Drawings for actual connection points.

Figure 59 - Terminal Block Strip locations



Connect External Control Signal Wiring

Introduction

This section summarizes the control signal wiring from the remote DCS/PLC or discrete control to the drive. General connections are detailed in Power Cabling and Control Signal Wiring Details (For UL) on page 151. Refer to the Electrical Drawings for connection information specific to the drive being installed.

Analog and Digital I/O Overview

Four 4...20 mA analog input signals. One may be used for DCS with rotating speed setting and three for backup. For detailed information, see <u>Table 59</u> and <u>Table 60 on page 153</u>.

Two 4...20 mA analog output signals for indication signals such as output motor current and frequency. see <u>Table 59</u> and <u>Table 60 on page 153</u>.

Sixteen passive dry contact inputs (internal 24V DC power supply) start/stop and reset controls. For detailed information, see <u>Table 59</u> and <u>Table 60 on page 153</u>. These inputs are scalable depending on user requirements.

Twenty dry contact outputs: including nine active dry contact outputs with a capacity of not more than 20W for indication (backup), and 11 passive dry contact outputs powered by the drive with a capacity of 220V AC/5A for DCS status/fault indication. For detailed information, see <u>Table 59</u> and <u>Table 60 on page 153</u>. These outputs are scalable depending on user requirements.

The drive is provided with dry contact outputs (1 N.O. with a capacity of 220V AC/5 A, valid when closed) which trigger the user-provided medium voltage circuit breaker for interlock with the user-provided medium voltage switch cabinet. For detailed information, see <u>Table 59</u> and <u>Table 60 on page 153</u>.

Ethernet interface is supplied as standard (other communication interfaces including Modbus and Profibus are provided as options).

Wiring Routing and Connection

The control signal wiring enters the drive through the same opening as the control power wiring in the LV Control Cabinet (Figure 58).

The wiring terminates either to the DTB1 or DTB2 terminal block strips on either side of the LV Control cabinet (Figure 59). See Figure 87 or Figure 88 for general information. Refer to Electrical Drawings for actual connection points.

Connect Electrical Safety Interlock Circuit to Input Circuit Breaker

Introduction

The electrical safety interlock circuit is part of the overall control signal wiring activity. However, it is mentioned separately in this document due to its critical importance related to the safe operation of the drive and personnel safety.

The circuits connected between the drive and the input circuit breaker:

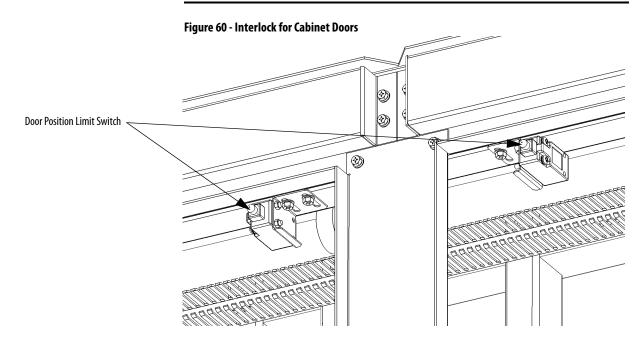
- allow the drive to trip the input circuit breaker if a drive cabinet door is opened. This applies to the cabinet doors where medium voltage is present. The LV Control cabinet door can be opened while the drive is energized.
- allow the drive to prevent the input circuit breaker from closing when required.
- indicate to the drive when the input circuit breaker is closed.

MV Door Safety Interlock

If the MV cabinet door is opened, the Allen-Bradley Guardmaster Limit Switch (440P-CRPS11D4B) on the cabinet door will actuate. The drive will send a trip signal to the input circuit breaker to disconnect the medium voltage power supply to the drive.



ATTENTION: The door position interlock is a safety feature. It must not be used solely as a part of the plant operation process to ensure the drive has been disconnected from input medium voltage. Keep the medium voltage doors locked as standard practice. Always go to the input circuit breaker feeding the drive to verify if it is open. Lock out and tagout the input circuit breaker before performing any work on the drive or bypass units.



When the doors of the Power Module/LV Control Cabinet or Isolation Transformer Cabinet are not closed, when the drive is being maintained or when the control power switch is not closed, the drive will not send a signal allowing the input circuit breaker to close; this is wired as a permissive contact in the input circuit breaker's closing circuit so that the input circuit breaker cannot close.

Wire Routing and Connection

The electrical safety interlock control signal wiring enters the drive through the same opening as the control power wiring in the bottom of the LV Control Cabinet (Figure 58).

The wiring terminates to the DTB1 terminal block strip on the right side of the LV Control cabinet (<u>Figure 59</u>). See <u>Figure 87</u> or <u>Figure 88</u> for general information. Refer to Electrical Drawings for actual connection points.

Notes:

Drive Electrical Interconnection (For IEC)

Introduction

The drive is shipped in two sections, the Isolation Transformer cabinet and the Power Module/LV Control cabinet. An optional bypass cabinet may also be supplied. Chapter 2 describes mechanically joining these cabinets together. This chapter describes the activities required to electrically connect these drive cabinets' components together (information about connecting the Bypass cabinet to the drive is included in publication 6000-UM002_-EN-P, 6012DB Medium Voltage Bypass Cabinet User Manual).

Electrical Interconnection Summary

Connect Internal Cabling and Wiring	
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Connect Motor and Voltage Sensing Board Cables	<u>100</u>
Connect LV Control and Fan Wiring Bundles	<u>102</u>
Connect Ground Bus	<u>105</u>

Power Cable Interconnection Overview

Figure 61 provides a three-line drawing overview of the power cable interconnections between the power modules (PC XX) in the Power Module/ LV Control cabinet and the secondary windings of the isolation transformer in the Isolation Transformer cabinet. The number of power modules is dependent solely on output (motor) voltage:

- 9 power modules for 3/3.3 kV
- 18 power modules for 6/6.6 kV
- 27 power modules for 10 kV

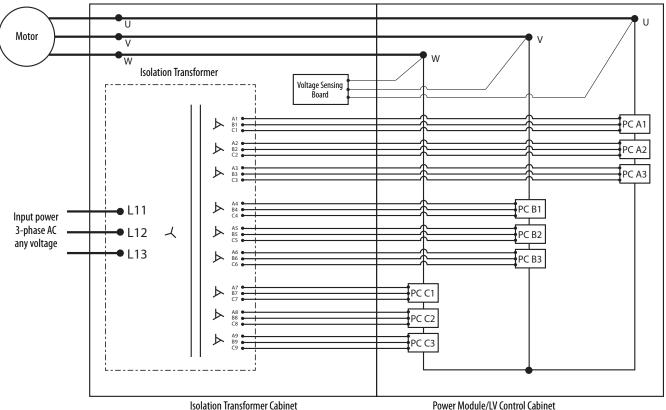
It also shows the connection point from the U, V, and W motor output phases from the power module array to the voltage sensing board cables and the motor cables.

The isolation transformer secondary windings as shown do reflect the actual orientation on the isolation transformer.

The Power Module/LV Cabinet orientation is optimized for drawing clarity. To better understand the physical orientation, the components and connections shown in the Power Module/LV Control Cabinet would be rotated 90° counter clockwise. The U phase is the top horizontal row, the V phase is the middle horizontal row, and the W phase is the bottom horizontal row.

Refer to the Electrical Drawing for actual wire number designations.

Figure 61 - Power Cabling Overview (3.3 kV Fixed-mounted Power Module Configuration)



Connect Isolation Transformer Secondary Power Cables

Introduction

The isolation transformer's three-phase primary coils are oriented C, B, and A from left to right, as viewed from the front. The secondary windings are also divided into three principal sections from top to bottom. The upper third are to feed the power modules in the U output phase. The middle third are to feed the power modules in the V output phase. The bottom third are to feed the power modules in the W output phase (Figure 62).

PRIMARY WINDING INPUT C (L3) B (L2) A (L1) SECONDARY WINDING OUTPUT

Figure 62 - Isolation Transformer Primary and Secondary Winding Orientation

The secondary windings are brought out to corresponding vertical isolated standoffs on the body of the transformer (orientated C, B, and A from left to right as viewed from the front). See Figure 63. Each secondary winding set will have a designated C, B, and A terminal connection. For example, (from top to bottom and left to right) the terminals from the first winding set are C1, B1, and A1, the terminals from the next winding set are C2, B2, and A2, and so on.

As shown in Figure 61, the first winding set (C1, B1, and A1) will connect to the three-phase input power connection of the first power module in the U motor phase array (PCA1), the second winding set will connect to the second power module in the U motor phase array (PCA2), and the third winding set will connect to the third power module in the U motor phase array (PCA3). The next three winding sets connect to the power modules in the V motor phase array. The remaining three winding sets connect to the power modules in the W motor phase array.

Figure 61 shows 3/3.3 kV configuration. The 6/6.6 kV and 10 kV configuration have more power modules and therefore have more corresponding isolation transformer secondary windings. The concept is the same—the top third of the winding sets feeds the power modules in the U phase, the middle third feeds the power modules in the V phase, and the bottom third feeds the power modules in the W phase.

Each three-phase secondary winding set of the isolation transformer has three individual single phase power cables connecting its output to the three-phase power input of its corresponding power module.

For drives with fixed-mounted power modules, the U and W phase interconnections to the isolation transformer secondary windings are on the front of the isolation transformer and the connections to the V phase are on the rear of the isolation transformer. The power cable connections to the power modules are made at the factory. Therefore, the field power cable connections need to be made at the isolation transformer secondary winding termination points (Figure 63).

For drives with drawout power modules, all of the interconnections between the isolation transformer secondary windings and the power modules are made in the rear of the isolation transformer and the connection to the power modules are also in the rear. The power cable connections to the isolation transformer secondary winding termination point are made at the factory. Therefore, the field power cable connections must be made at the power module input points (Figure 64).

Cable Routing and Connection

Figure 63 - 6/6.6 kV (Fixed-mounted Power Module Configuration)

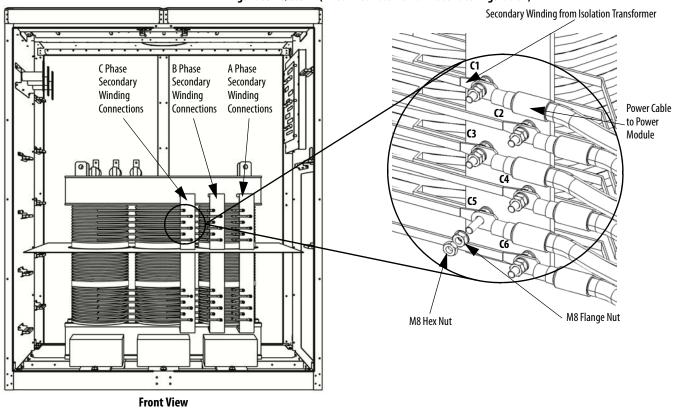
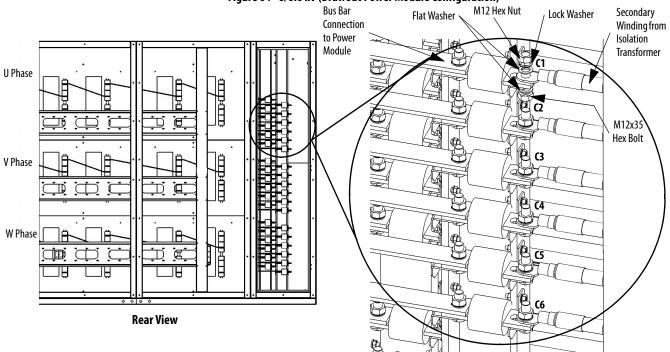


Figure 64 - 6/6.6 kV (Drawout Power Module Configuration)



Connect Motor and Voltage Sensing Board Cables

Introduction

The Voltage Sensing Board cables and the motor cables both connect to the same output point of each motor phase array (Figure 61). However, because the fixed-mount and drawout power module mechanical designs are different, the physical connection point differs between these two configurations.

The voltage sensing board cables and motor cables are always bundled in the isolation transformer cabinet for shipment.

Front View

WS Cable

M10x30 Hex Bolt

Work Cable

Motor Cable

Motor Cable

Motor Cable

W Phase

W Phase

W Phase

Figure 65 - 6/6.6 kV (Fixed-mounted Power Module Configuration)

Motor Cable

We have

We have

We have

We have

We have

We have

Motor Cable

VSB Cable

VSB Cable

VSB Cable

Figure 66 - 6/6.6 kV (Drawout Power Module Configuration)

Rear View

Connect LV Control and Fan Wiring Bundles

Introduction

There are control wiring bundles that must be reconnected after the drive cabinets are connected together. These control wiring bundles are connected for the factory test and then disconnected and bundled at the shipping splits before shipment.

Each of the four drive configurations are shown:

- Fixed-mounted Power Module (without Bypass)
- Fixed-mounted Power Module (with Bypass)
- Drawout Power Module (without Bypass)
- Drawout Power Module (with Bypass)

Each configuration shows the "as shipped" state. This shows where the wire bundles are coiled up, where they originate, where they terminate, and whether they are ran in the front or rear wireway. The "connected" state is also shown for each configuration. For exact wire numbers and terminal block designations, refer to the Electrical Drawings.

X1 to X5 refer to terminal block strips in the various cabinets.

Fixed-mounted Power Module Configuration (without Bypass)

Fan (to X4)

X1 (to X4)

X2 (to X3)

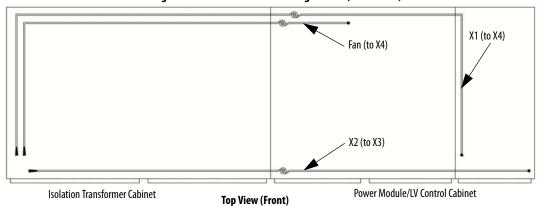
Isolation Transformer Cabinet

Power Module/LV Control Cabinet

Figure 67 - Interconnection Configuration (As shipped)

Figure 68 - Interconnection Configuration (Connected)

Top View (Front)



Fixed-mounted Power Module Configuration (with Bypass)

Figure 69 - Interconnection Configuration (As shipped)

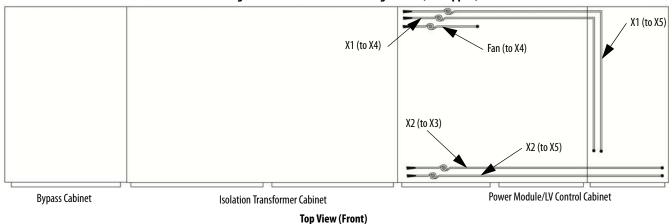
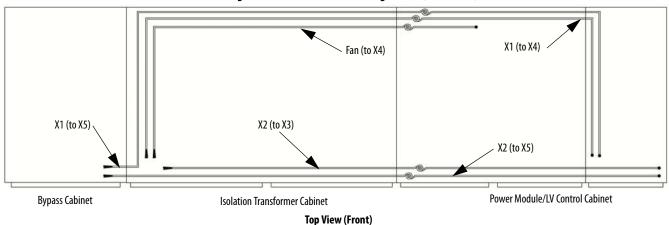
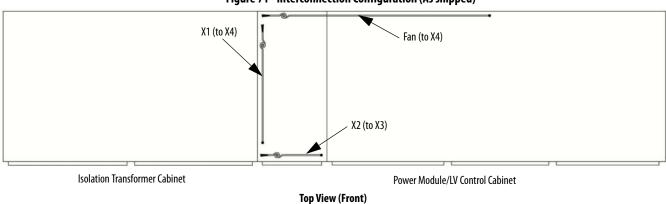


Figure 70 - Interconnection Configuration (Connected)



Drawout Power Module Configuration (without Bypass)

Figure 71 - Interconnection Configuration (As shipped)



Isolation Transformer Cabinet

Power Module/LV Control Cabinet

Top View (Front)

Figure 72 - Interconnection Configuration (Connected)

Drawout Power Module Configuration (with Bypass)

Figure 73 - Interconnection Configuration (As shipped)

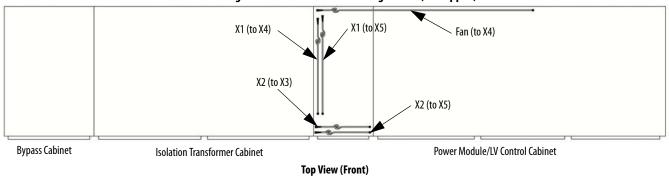
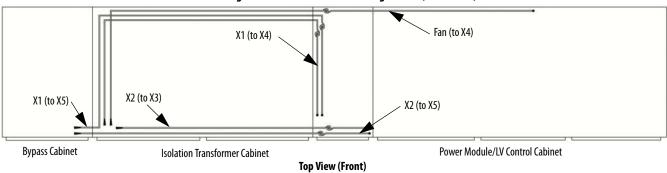


Figure 74 - Interconnection Configuration (Connected)

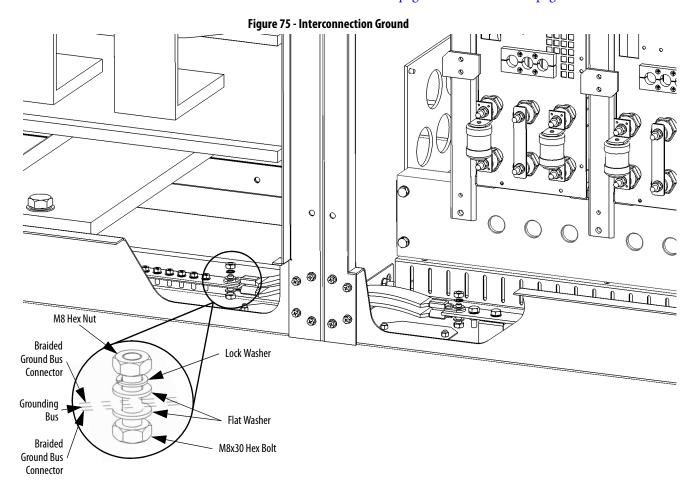


Connect Ground Bus

Introduction

A solid ground bus is located at the bottom front of each cabinet. When a shipping split is required, two braided ground bus connectors are supplied. One is attached above the solid ground bus and one below (Figure 75).

Ground bus connection openings are provided in the cabinet sidesheets for this connection. See <u>Table 9 on page 45</u> and <u>Table 10 on page 46</u>.



Complete the Installation

- 1. Inspect the interior of all cabinets carefully for hardware or tools that may have been misplaced.
- 2. Check and verify that no hardware or foreign material has fallen in the secondary windings in the Isolation Transformer cabinet.
- **3.** Check that all mechanical work has been completed properly. All barriers and guards that may have been removed must be reinstalled.
- **4.** Check that all electrical connections have been made and torqued as specified.
- 5. Verify the safety circuit is working properly (see page 79).
- **6.** Reinstall all of the cabinet back plates.

Notes:

Drive Electrical Interconnection (For UL)

Introduction

The drive is shipped in two sections, the Isolation Transformer cabinet and the Power Module/LV Control cabinet. An optional bypass cabinet may also be supplied. Chapter 2 describes mechanically joining these cabinets together. This chapter describes the activities required to electrically connect these drive cabinets' components together (information about connecting the Bypass cabinet to the drive is included in publication 6000-UM002_-EN-P, 6012DB Medium Voltage Bypass Cabinet User Manual).

Electrical Interconnection Summary

Connect Internal Cabling and Wiring	
Connect Isolation Transformer Secondary Power Cables	<u>109</u>
Connect Motor and Voltage Sensing Board Cables	<u>112</u>
Connect LV Control and Fan Wiring Bundles	<u>113</u>
Connect Ground Bus	<u>114</u>

Power Cable Interconnection Overview

<u>Figure 76</u> provides a three-line drawing overview of the power cable interconnections between the power modules (PC XX) in the Power Module/ LV Control cabinet and the secondary windings of the isolation transformer in the Isolation Transformer cabinet. The number of power modules is dependent solely on output (motor) voltage:

- 9 power modules for 2.3/2.4 kV
- 12 power modules for 4.0/4.16 kV
- 18 power modules for 6.0/6.3/6.6 kV

It also shows the connection point from the U, V, and W motor output phases from the power module array to the voltage sensing board cables and the motor cables.

The isolation transformer secondary windings as shown do reflect the actual orientation on the isolation transformer.

The Power Module/LV Cabinet orientation is optimized for drawing clarity. To better understand the physical orientation, the components and connections shown in the Power Module/LV Control Cabinet would be rotated 90° counter clockwise. The U phase is the top horizontal row, the V phase is the middle horizontal row, and the W phase is the bottom horizontal row. Refer to the Electrical Drawing for actual wire number designations.

U Motor **Isolation Transformer** Voltage Sensing Board PCA1 PCA2 PCA3 PCB1 Input power 3-phase AC PCB2 any voltage РСВ3 PCC1 PCC2 PCC3

Power Module/LV Control Cabinet

Figure 76 - Power Cabling Overview (2.3/2.4 kV Fixed-mounted Power Module Configuration)

Isolation Transformer Cabinet

Connect Isolation Transformer Secondary Power Cables

Introduction

The isolation transformer's three-phase primary coils are oriented L1, L2, and L3 from left to right, as viewed from the front. The secondary windings are also divided into three principal sections from top to bottom. The upper third are to feed the power modules in the U output phase. The middle third are to feed the power modules in the V output phase. The bottom third are to feed the power modules in the W output phase (Figure 77).

PRIMARY WINDING INPUT L1 L2 L3 **SECONDARY** WINDING OUTPUT

Figure 77 - Isolation Transformer Primary and Secondary Winding Orientation

The secondary windings are brought out to corresponding vertical isolated standoffs on the body of the transformer (orientated L1, L2, and L3 from left to right as viewed from the front). See <u>Figure 78</u>. Each secondary winding set will have a designated W, V, and U terminal connection. For example, (from top to bottom and left to right) the terminals from the first winding set are 1U, 1V, and 1W, the terminals from the next winding set are 2U, 2V, and 2W, and so on.

As shown in Figure 76, the first winding set (1U, 1V, and 1W) will connect to the three-phase input power connection of the first power module in the U motor phase array (PCA1), the second winding set will connect to the second power module in the U motor phase array (PCA2), and the third winding set will connect to the third power module in the U motor phase array (PCA3). The next three winding sets connect to the power modules in the V motor phase array. The remaining three winding sets connect to the power modules in the W motor phase array.

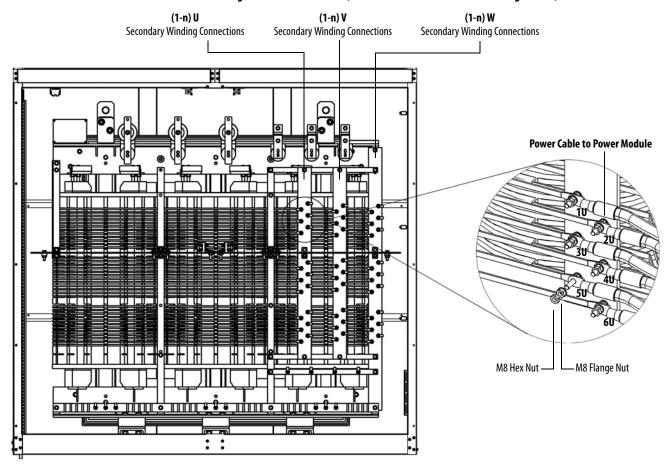
Figure 76 shows 2.3/2.4 kV, 4.0/4.16 kV, 6.0 kV, 6.3 kV, and 6.6 kV configuration. Larger configurations have more power modules and therefore have more corresponding isolation transformer secondary windings. The concept is the same—the top third of the winding sets feeds the power modules in the U phase, the middle third feeds the power modules in the V phase, and the bottom third feeds the power modules in the W phase.

Each three-phase secondary winding set of the isolation transformer has three individual single phase power cables connecting its output to the three-phase power input of its corresponding power module.

For drives with fixed-mounted power modules, the U, V, and W phase interconnections to the isolation transformer secondary windings are on the front of the isolation transformer. The power cable connections to the power modules are made at the factory. Therefore, the field power cable connections need to be made at the isolation transformer secondary winding termination points (Figure 78).

Cable Routing and Connection

Figure 78 - 6.0/6.3/6.6 kV (Fixed-mounted Power Module Configuration)



Front View

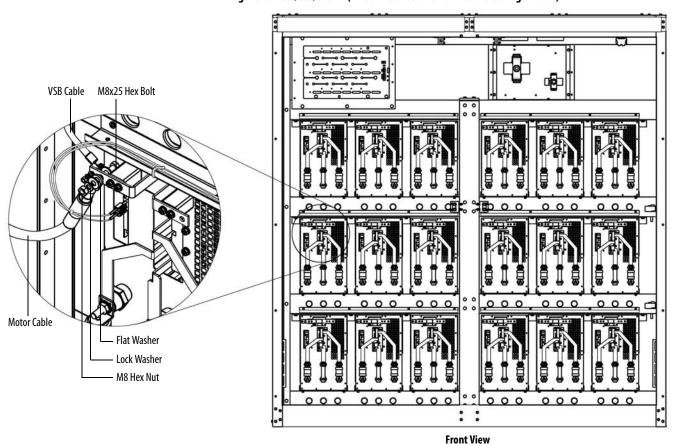
Connect Motor and Voltage Sensing Board Cables

Introduction

The Voltage Sensing Board cables and the motor cables both connect to the same output point of each motor phase array (Figure 76).

The voltage sensing board cables and motor cables are always bundled in the isolation transformer cabinet for shipment.

Figure 79 - 6.0/6.3/6.6 kV (Fixed-mounted Power Module Configuration)



Connect LV Control and Fan Wiring Bundles

Introduction

There are control wiring bundles that must be reconnected after the drive cabinets are connected together. These control wiring bundles are connected for the factory test and then disconnected and bundled at the shipping splits before shipment.

The configuration "Fixed-mounted Power Module (without Bypass)" is shown below.

The configuration is shown in the "as shipped" state. This shows where the wire bundles are coiled up, where they originate, where they terminate, and whether they are ran in the front or rear wireway. The "connected" state is also shown for each configuration. For exact wire numbers and terminal block designations, refer to the Electrical Drawings.

DTB1 to DTB4 refer to terminal block strips in the various cabinets.

Fixed-mounted Power Module Configuration (without Bypass)

Figure 80 - Interconnection Configuration (As shipped)

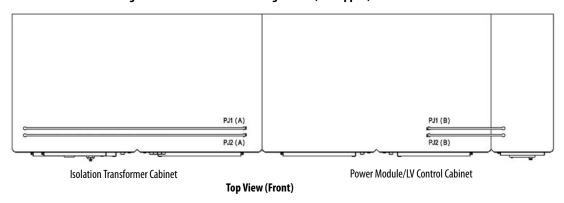
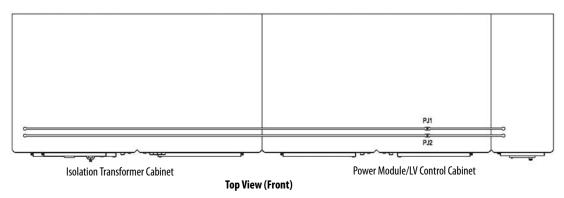


Figure 81 - Interconnection Configuration (Connected)



Connect Ground Bus

Introduction

A solid ground bus is located at the bottom front of each cabinet. When a shipping split is required, two braided ground bus connectors are supplied. One is attached above the solid ground bus and one below (Figure 82).

Ground bus connection openings are provided in the cabinet sidesheets for this connection. See <u>Table 13 on page 60</u>.

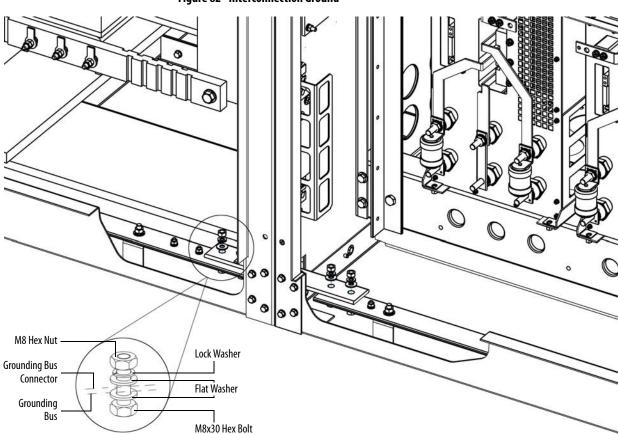


Figure 82 - Interconnection Ground

Complete the Installation

- 1. Inspect the interior of all cabinets carefully for hardware or tools that may have been misplaced.
- 2. Check and verify that no hardware or foreign material has fallen in the secondary windings in the Isolation Transformer cabinet.
- 3. Check that all mechanical work has been completed properly. All barriers and guards that may have been removed must be reinstalled.
- **4.** Check that all electrical connections have been made and torqued as specified.
- 5. Verify the safety circuit is working properly (see page 92).
- 6. Reinstall all of the cabinet back plates.

Pre-Commissioning

Pre-Commissioning Responsibilities

Rockwell Automation manages the start-up service for each installed drive at the customer's site, but there are a number of tasks the customer or its representatives must complete before scheduling Rockwell Automation personnel for drive commissioning.

Review this information prior to commissioning the drive as a reference for drive line-up commissioning. Record the information in the data sheets provided; these are useful during future maintenance and troubleshooting exercises.



ATTENTION: Perform the pre-commissioning tasks in the order listed in this chapter. Failure to do so may result in equipment failure or personal injury.

IMPORTANT

Rockwell Automation requests a minimum of four weeks' notice to schedule each start-up.

Inspection and Verification

Before the drive commissioning occurs, Rockwell Automation recommends that the customer arranges a pre-installation meeting to review:

- a. the start-up plan
- b. the start-up schedule
- c. the drive(s) installation requirements
- d. the pre-commissioning checklist

Customer personnel must be on-site to participate in the system start-up procedures.

See Safety and Codes on page 81.



ATTENTION: The CMOS devices used on the control circuit boards are susceptible to damage or destruction by static charges. Personnel working near static sensitive devices must be appropriately grounded.

Pre-Commissioning Checklist

Once all points of the checklist are complete, initial each check box and provide the date. Photocopy the checklist and fax the copy to the Rockwell Automation Start-up Manager, along with the planned start-up date. Upon receiving this checklist, the Project Manager will contact the site to finalize arrangements for a start-up engineer to travel to the site at your convenience.

Please print the following information:

Name:	Date:
Company:	
Phone:	Pages:
Fax:	
Drive Serial Number:	
Rockwell Automation Service Engineer Requested (YES/NO):	
Scheduled Commissioning Date:	

Table 20 - Receiving and Unpacking:

Initials	Date	Check	
			The drives have been checked for shipping damage upon receiving.
			After unpacking, the item(s) received are verified against the bill of materials.
			Any claims for breakage or damage, whether concealed or obvious, are made to the carrier by the customer as soon as possible after receipt of shipment.
			All packing material, wedges, or braces are removed from the drive.

Table 21 - Installation and Mounting:

Initials	Date	Check	
			The drive is securely fastened in an upright position, on a level surface.
			The Isolation Transformer Cabinet, Power Module Cabinet, and Bypass Cabinet (if applicable) are correctly installed.
			Lifting Angles have been removed.
			Bolts are inserted into original location on top of drive (prevent leakage of cooling air).
			All contactors and relays have been operated manually to verify free movement.
			The back plates to the cabinets have been reinstalled.

Table 22 - Safety:

Initials	Date	Check	
			The grounding of the drive should be in accordance with national and local electrical codes.

Table 23 - Control Wiring:

Initials	Date	Check	
			All low voltage wiring entering the drive is labeled, appropriate wiring diagrams are available, and all customer interconnections are complete.
			All AC and DC circuits are run in separate conduits.
			All wire sizes used are selected by observing all applicable safety and national and local electrical codes.
			Remote I/O is correctly installed and configured (if applicable).
			All 3-phase control wiring is within specified levels and has been verified for proper rotation, UVW.
			All single-phase control wiring is within specified levels and has grounded neutrals.
			Control lines must be shielded and grounded. Control and Power lines must run in separate conduits.
			The electrical safety interlock wiring to input circuit breaker is correctly installed.

Table 24 - Power Wiring:

Initials	Date	Check	
			The power cable connections to the drive, motor and isolation transformer adhere to national and local electrical codes.
			The cable terminations, if stress cones are used, adhere to the appropriate standards.
			Appropriate cable insulation levels are adhered to, as per Rockwell Automation specifications.
			All shields for shielded cables must be grounded at the source end only.
			If shielded cables are spliced, the shield must remain continuous and insulated from ground.
			All wire sizes used are selected by observing all applicable safety and national and local electrical codes.
			All power connections are torqued as per Rockwell Automation specifications. Refer to Torque Requirements on page 119.
			All customer power cabling has been meggered or hi-pot tested before connecting to drive system.
			Power wiring phase rotation has been verified per the specific electrical diagrams supplied by Rockwell Automation.

Table 25 - Interconnection Wiring

Initials	Date	Check	
			The power cable connection between the Isolation Transformer and Power Modules.
			The motor cable connection to the three output buses.
			The Voltage Sensing Board connections to the three output buses.
			All low voltage connections to the Isolation Transformer Low Voltage panel.

Table 26 - Drive Line-up Status

Initials	Date	Check	
			The medium voltage and low voltage power is available for startup activities.
			The motor is uncoupled from the driven load.
			The load is available for full load testing.

Torque Requirements

Torque Requirements

Proper tightening torque must be used for installation and wiring.

Table 27 - Torque Requirements for IEC

Thread Size	Toro	que	
i nread Size	N•m	lb•ft	
M4	1.4	1.0	
M5	2.8	2.1	
M6	4.6	3.4	
M8	11	8.1	
M10	22	16.2	
M12	39	28.8	
M14	62	45.7	
M16	95	70.1	
M20	184	135.7	

Table 28 - Torque Requirements for UL

Thread Size	Tor	que
Tifread Size	N•m	lb•ft
M4	3.0	2.2
M5	5.9	4.4
M6	10.5	7.7
M8	26.0	19.2
M10	51.0	37.6
M12	89.0	65.7
M14	141.0	104.1
M16	215.0	158.7
M20	420.0	310.0

Notes:

General Wire Categories

General Wire Categories

Conductors Category	Conductors Group	Machine With	Signal Examples	Recommended Cable	Conductors Group	Power Supplies mm (in.)	Control mm (in.)	To PLC
Power Supplies	1	AC power supply (TO 600V AC)	220V, 1Ø	Per IEC / NEC, Local codes and application requirements	Tray	228.6 (9.00)	152.4 (6.00)	All signal wiring must be run in separate steel conduit. A wire tray is not suitable. The minimum spacing between conduits containing different wire groups is 76.2 mm (3 in.).
Control	2	220V AC or 220V DC Logic	Relay Logic PLC I/O	Per IEC / NEC, Local codes and application requirements	Tray	228.6 (9.00)	152.4 (6.00)	
	3	24V AC or 24V DC logic	PLC I/O	Per IEC / NEC, Local codes and application requirements	Tray	228.6 (9.00)	152.4 (6.00)	
To PLC	4	Analog Signal DC supply	524V DC Supplies	Belden 8760 ⁽¹⁾ Belden 8770 ⁽²⁾ Belden 9460 ⁽³⁾	All signal wirir conduit. A wire tray is r	ng must be run ir	separate steel	
	5	Digital circuit (high speed)	Pulse train input tachometer PLC communication	Belden 8760 ⁽¹⁾ Belden 9460 ⁽³⁾ Belden 9463 ⁽⁴⁾		spacing betwee ferent wire grou		

^{(1) 18} AWG, twisted pair, shielded

^{(2) 18} AWG, 3 conductor, shielded

^{(3) 18} AWG, twisted pair, shielded

^{(4) 24} AWG, twisted pair, shielded

Notes:

PowerFlex 6000 Dimensions and Weights (For IEC)

Overview

Dime	Dimensions (mm)				
W1	Width of Cabinet 1 (Isolation Transformer section)				
W2	Width of Cabinet 2 (Power Module section and Low Voltage Control section)				
W	Total width				
D1	Depth of cabinet base (footprint)				
D2	Depth of doors beyond cabinet base				
D	Total depth (including door depth)				
H1	Height of Cabinet				
H2	Height of Fan				
Н	Total height (including fan)				

Weigh	et (kg)
M1	Weight of Cabinet 1 (Isolation Transformer section)
M2	Weight of Cabinet 2 (Power Module section and Low Voltage Control section)
М	Total weight



 Table 29 - 3000V AC Input/output (18 Pulse Configuration - 9 Power Cells)

	Ī	1	_	<u>_</u>	ا	ا			~	~	~	~		4	4	4	4	4	4	4
		Nol	CFM	3883	3883	3883	3883	3883	3883	3883	3883	3883	3883	5824	5824	5824	5824	5824	5824	5824
	~	Fotal Airflow	L/s	1884	1884	1884	1884	1884	1884	1884	1884	1884	1884	2750	2750	2750	2750	2750	2750	2750
	W2	ı	m³/s	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.8	2.8	2.8	2.8	2.8	2.8	2.8
y Fans		Number	Fans	-	_	_	-	-	1	1	1	1	-	-	2	2	2	2	2	2
Cooling Fans		A	CFM	1942	1942	1942	1942	1942	1942	1942	1942	1942	1942	3883	3883	3883	3883	3883	3883	3883
		Fotal Airflow	L/s	917	917	917	917	917	917	917	917	917	917	1834	1834	1834	1834	1834	1834	1834
	W1	Tot	m³/s	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9
		Number	or Fans	-	-	-	-	-	-	1	1	-	-	-	2	2	7	7	2	2
		:	٤	2930	2980	3030	3080	3130	3180	3230	3370	3420	3470	3710	3760	3810	3860	90905	5260	5360
	Weight (kg)	-	Ž K	1080	1080	1080	1080	1080	1080	1080	1170	1170	1170	1360	1360	1360	1360	1360	1360	1360
	We	-	Ē	1850	1900	1950	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	3700	3900	4000
		=	-	2730	2730	2730	2730	2730	2730	2730	2730	2730	2730	2730	2730	2730	2730	2730	2730	2730
	Height	=	2	330	330	330	330	330	330	330	330	330	330	330	330	330	330	330	330	330
	_	3	Ē	2400	2400	2400	2400	2400	2400	2400	2400	2400	2400	2400	2400	2400	2400	2400	2400	2400
nm)		٥	<u> </u>	1362	1362	1362	1362	1362	1362	1362	1362	1362	1362	1362	1362	1362	1362	1362	1362	1362
Dimensions (mm)	Depth	2	70	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Dime		2	5	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300
		3	S	3780	3780	3780	3780	3780	3780	3780	3780	3780	3780	4400	4400	4400	4400	4400	4400	4400
	Width	Ş	7	1780	1780	1780	1780	1780	1780	1780	1780	1780	1780	2000	2000	2000	2000	2000	2000	2000
		74	-	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2400	2400	2400	2400	2400	2400	2400
Trancformor	Rating	T-NA	KVA	400	450	200	260	630	710	750	800	006	1000	1150	1250	1400	1500	1600	1800	2000
		=	<u>-</u>	420	480	530	580	029	750	800	850	096	1070	1230	1340	1500	1600	1710	1930	2140
Typical	Power Rating	77	Ž	320	360	400	440	200	260	009	640	720	800	920	1000	1120	1200	1280	1440	1600
,	utput ps	1	i E	96	108	120	134	150	168	180	192	216	240	270	300	336	360	378	420	456
	A A A Output Amps			08	06	100	112	125	140	150	160	180	200	225	250	780	300	315	350	380

<u>A A A</u> Output		al Motor	Transformer				Dimen	Dimensions (mm)	(MI				Š						Coolin	Cooling Fans			
Amps		Power Rating	Rating		Width			Depth			Height		Š	weignt (kg)	_		W	_			W2		
Cont		=	3	ì	1	:	2	2	4	:	:	-	:	:	:	Number	1	Fotal Airflow	WO	Number	0	Total Airflow	*
	Min.	운	KVA	S	M2	>	5	70	-	Ē	2		Ē	Ž	E	ot Fans	m³/s	L/s	CFM	ot Fans	m³/s	r/s	CFM
6 08	96 360	480	450	2000	1780	3780	1300	62	1362	2400	330	2730	1950	1080	3030	-	1.0	917	1942	-	1.9	1834	3883
90 10	108 400	530	200	2000	1780	3780	1300	62	1362	2400	330	2730	2050	1080	3130	1	1.0	917	1942	-	1.9	1834	3883
100 12	120 440	280	290	2000	1780	3780	1300	62	1362	2400	330	2730	2150	1080	3230	-	1.0	917	1942	-	1.9	1834	3883
112 13	134 500	0/9	089	2000	1780	3780	1300	62	1362	2400	330	2730	2200	1080	3280	1	1.0	917	1942	-	1.9	1834	3883
125 15	150 560	750	710	2000	1780	3780	1300	62	1362	2400	330	2730	2250	1080	3330	1	1.0	917	1942	-	1.9	1834	3883
140 16	168 640	850	800	2000	1780	3780	1300	62	1362	2400	330	2730	2400	1080	3480	-	1.0	917	1942	-	1.9	1834	3883
150 18	180 680	910	850	2000	1780	3780	1300	62	1362	2400	330	2730	2450	1080	3530	_	1.0	917	1942	-	1.9	1834	3883
160 19	192 720	096	006	2000	1780	3780	1300	62	1362	2400	330	2730	7600	1170	3770	1	1.0	917	1942	-	1.9	1834	3883
180 27	216 800	1070	1000	2000	1780	3780	1300	62	1362	2400	330	2730	2700	1170	3870	1	1.0	917	1942	-	1.9	1834	3883
200 2	240 890	1190	1120	2000	1780	3780	1300	62	1362	2400	330	2730	2800	1170	3970	1	1.0	917	1942	-	1.9	1834	3883
225 27	270 1010	1350	1265	2400	2000	4400	1300	62	1362	2400	330	2730	3250	1360	4610	2	1.9	1834	3883	7	2.8	2750	5824
250 30	300 1120	1500	1400	2400	2000	4400	1300	62	1362	2400	330	2730	3500	1360	4860	2	1.9	1834	3883	7	2.8	2750	5824
280 33	336 1260	1680	1575	2400	2000	4400	1300	62	1362	2400	330	2730	3700	1360	2060	2	1.9	1834	3883	2	2.8	2750	5824
300 36	360 1320	1760	1650	2400	2000	4400	1300	62	1362	2400	330	2730	3900	1360	5260	2	1.9	1834	3883	7	2.8	2750	5824
315 37	378 1400	1870	1750	2400	2000	4400	1300	62	1362	2400	330	2730	4000	1360	5360	2	1.9	1834	3883	7	2.8	2750	5824
350 42	420 1560	2090	1950	2400	2000	4400	1300	62	1362	2400	330	2730	4200	1360	2560	7	1.9	1834	3883	7	2.8	2750	5824
380 45	456 1720	2300	2150	2400	0000	4400	1300	69	1367	0070	330	730	1500	1360	0965	ر	1.0	1834	2002	ر	0 0	2750	1007

Table 31 - 6000V AC Input/Output (36 Pulse Configuration - 18 Power Cells)

ı	Ì	1		l	ı	i	i	i	ı	l	i	i	i	l	l	l	i	i	l	i	l	l	l	l	l	i	l	l	i	i	I '
		low	CFM	3883	3883	3883	3883	3883	3883	3883	3883	3883	3883	3883	3883	3883	3883	5824	5824	5824	5824	5824	5824	5824	7412	7412	7412	7412	7412	9883	9883
		Total Airflow	S/7	1834	1834	1834	1834	1834	1834	1834	1834	1834	1834	1834	1834	1834	1834	2750	2750	2750	2750	2750	2750	2750	3500	3500	3500	3500	3500	4667	4667
	W2	OT.	s/ _s m	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.8	2.8	2.8	2.8	2.8	2.8	2.8	3.5	3.5	3.5	3.5	3.5	4.7	4.7
Fans		Number	or Fans	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	4	4
Cooling Fans		^	CFM	1942	1942	1942	1942	1942	1942	1942	1942	1942	1942	1942	1942	1942	1942	3883	3883	3883	3883	3883	3883	3883	4942	4942	4942	4942	4942	7412	7412
		Total Airflow	rk	917	917	917	917	917	917	917	917	917	917	917	917	917	917	1834	1834	1834	1834	1834	1834	1834	2334	2334	2334	2334	2334	3500	3500
	M1	Tota	m³/s	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.4	2.4	2.4	2.4	2.4	3.5	3.5
		Number	Fans	-	-	1	1	1	-	-	-	1	1	-	-	-	-	2	2	2	2	2	2	2	2	2	2	2	2	3	3
			E .	3060	3110	3160	3210	3310	3410	3510	3560	3610	3760	3860	4060	4140	4210	4460	4660	4860	5440	5740	6040	7920	8020	8120	8520	0/98	8820	9070	0026
L4 (L.m.)	weigiit (kg <i>)</i>	-	Z	1360 3	1360 3	1360 3	1360 3	1360 3	1360	1360 3	1360 3	1360 3	1360 3	1360 3	1360 4	1360 4	1360 4	1360 4	1360 4	1360 4	1740 5	1740 5	1740 6	3020 7	3020 8	3020 8	3020 8	3020 8	3020 8	3020	3300 9
	weig		- E	1700 13	1750 13	1800 13	1850 13	1950 13	2050 13	2150 13	2200 13	2250 13	2400 13	2500 13	2700 13	2780 13	2850 13	3100 13	3300 13	3500 13	3700 1;	4000 1;	4300 1;	4900 30	2000	5100 30	5500 30	2650 30	2800 30	9000	6400 33
			<u> </u>	2730 17	2730 1;	2730 18	2730 18	2730 19	2730 20	2730 2	2730 2.	2730 2.	2730 24	2730 25	2730 27	2730 27	2730 28	2730 3.	2730 33	2730 3.	2730 3.	2730 40	2730 43	2730 49	2730 50	2770 5	2770 5	2770 56	2770 58	2770 60	77.0 6
	Height		 Z	330 27	330 27	330 27	330 27	330 27	330 27	330 27	330 27	330 27	330 27	330 27	330 27	330 27	330 27	330 27	330 27	330 27	330 27	330 27	330 27	330 27	330 27	370 27	370 27	370 27	370 27	370 27	370 27
	Hei		= = =	2400 33	2400 33	2400 33	2400 33	2400 33	2400 33	2400 33	2400 33	2400 33	2400 33	2400 33	2400 33	2400 33	2400 33	2400 33	2400 33	2400 33	2400 33	2400 33	2400 33	2400 33	2400 33	2400 3.	2400 3	2400 3.	2400 3.	2400 3.	2400 3.
			<u> </u>	1362 24	1362 24	1362 24	1362 24	1362 24	1362 24	1362 24	1362 24	1362 24	1362 24	1362 24	1362 24	1362 24	1362 24	1362 24	1362 24	1362 24		1362 24	1362 24	1362 24	1362 24	1362 24	1362 24	1362 24	1362 24	1362 24	1562 24
ns (mm	Ę.																				1362										
Dimensions (mm)	Depth		70 ——	00 62	00 62	00 62	00 62	00 62	00 62	00 62	00 62	00 62	00 62	00 62	00 62	00 62	00 62	00 62	00 62	00 62	00 62	00 62	00 62	00 62	00 62	00 62	00 62	00 62	00 62	00 62	00 62
٥			<u> </u>	0 1300	0 1300	0 1300	0 1300	0 1300	0 1300	0 1300	0 1300	0 1300	0 1300	0 1300	0 1300	0 1300	0 1300	0 1300	0 1300	0 1300	0 1300	0 1300	0 1300	0 1300	0 1300	0 1300	0 1300	0 1300	0 1300	0 1300	0 1500
	゠		>	0 4000	0 4000	0 4000	0 4000	0 4000	0 4000	0 4000	0 4000	0 4000	0 4000	0 4000	0 4000	0 4000	0 4000	0 4000	0 4000	0 4000	0 4600	0 4600	0 4600	0 5930	0 5930	0 5930	0 5930	0 5930	0 5930	0 5930	0 5930
	Width		N N	0 2000	0 2000	0 2000	0 2000	0 2000	0 2000	0 2000	0 2000	0 2000	0 2000	0 2000	0 2000	0 2000	0 2000	0 2000	0 2000	0 2000	0 2400	0 2400	0 2400	0 3530	0 3530	0 3530	0 3530	0 3530	0 3530	0 3530	0 3530
_		747	\$	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2200	2200	2200	2400	2400	2400	2400	2400	2400	2400	2400
Transformer	Rating	777	KVA	250	780	315	355	400	450	200	260	630	710	800	006	1000	1120	1250	1400	1500	1600	1800	2000	2250	2500	2800	3000	3150	3500	3800	4200
lotor	ating	4	<u>-</u>	790	290	330	370	420	480	530	280	0/9	750	850	096	1070	1190	1340	1500	1600	1710	1930	2140	2410	7680	3000	3210	3370	3750	4070	4500
Typical Motor	Power Rating	F.W.	X	700	220	250	780	320	360	400	440	200	260	640	720	800	890	1000	1120	1200	1280	1440	1600	1800	7000	2240	2400	2520	7800	3040	3360
tput	· s	-	Min	30	33	38	43	48	54	09	<i>L</i> 9	75	85	96	108	120	134	150	168	180	192	216	240	270	300	336	360	378	420	456	504
A A A Out	Amps			25	78	32	36	40	45	20	99	63	71	08	06	100	112	125	140	150	160	180	700	225	250	780	300	315	350	380	420

Table 32 - 6600V AC Input/Output (36 Pulse Configuration - 18 Power Cells)

Amps Power Rating Amps Power Rating Cont. 1 kW Hp 25 30 220 290 28 33 250 330 32 38 280 370 36 43 320 420 40 48 360 480 45 54 400 530 50 60 440 580 56 67 500 670 63 75 560 750 71 85 640 850	Rating Hp Hp 290 330 370 420	Rating		Width		Ponth		,	:			Weic	Wainht (kg)								
220 220 250 280 320 360 440 560 640	330 370 420	Kating		Width		٤							(Ku) 1								
220 250 280 320 320 440 440 560 560	330 370 420	1.14		F	1	ַב <u>ֿ</u>	Depth		운	Height	+	·		:	-	LM -		:	_	W2	
220 250 280 320 340 440 560 560	330 370 420	KVA	W	W2	 ≽		 D3		 	2	<u> </u>	M1 N	M2	N N	Number of Face	Total/ m ³ /s	Total Airflow	Number of of	er Ta	Total Airflow	Flow CFM
250 280 320 360 440 500 560 640	330	280	2000	2000	4000 13	1300 6	62 13	1362 24	2400 3	330 2.	2730 17	1750 13	1360 31	3110							
280 320 360 400 440 500 560 640	370	320	2000	2000	4000 13	1300 6	62 13	1362 24	2400	330 2.	2730 18	1800 13	1360 37	3160	1	1.0	917 1942	1 1	1.9	1834	3883
320 360 400 500 560 640	420	355	2000	2000	4000 13	1300 6	62 13	1362 24	2400 3	330 2.	2730 18	1850 13	1360 32	3210	1	1.0	917 1942	1 1	1.9	1834	3883
360 400 440 500 560 640		400	2000	2000	4000 13	1300 6	62 13	1362 24	2400 3	330 2.	2730 19	1950 13	1360 33	3310	-	1.0	917 1942	1 1	1.9	1834	3883
400 440 500 560 640	480	450	2000	2000	4000 13	1300 6	62 13	1362 24	2400 3	330 2.	2730 20	2050 13	1360 34	3410	1	1.0	917 1942	1 1	1.9	1834	3883
500 560 640	530	200	2000	2000	4000 13	1300 6	62 13	1362 24	2400 3	330 2.	2730 27	2150 13	1360 35	3510	1	1.0	917 1942	1 1	1.9	1834	3883
500 560 640	580	260	2000	2000	4000 13	1300 6	62 13	1362 24	2400 3	330 2.	2730 22	2200 13	1360 35	3560	1	1.0	917 1942	1 1	1.9	1834	3883
560 640	0/9	930	2000	2000	4000 13	1300 6	62 13	1362 24	2400 3	330 2.	2730 22	2250 13	1360 36	3610	1	1.0	917 1942	1 1	1.9	1834	3883
640	750	710	2000	2000	4000 13	1300 6	62 13	1362 24	2400 3	330 2.	2730 24	2400 13	1360 37	3760	1	1.0	917 1942	1 1	1.9	1834	3883
	850	800	2000	2000	4000 13	1300 6	62 13	1362 24	2400 3	330 2.	2730 2	2500 13	1360 38	3860	1	1.0	917 1942	1 1	1.9	1834	3883
96 720	960	006	2000	2000	4000 13	1300 6	62 13	1362 24	2400 3	330 2.	2730 27	2700 13	1360 40	4060	1	1.0	917 1942	1 1	1.9	1834	3883
108 800	1070	1000	2000	2000	4000 13	1300 6	62 13	1362 24	2400 3	330 2.	2730 27	2780 13	1360 41	4140	1	1.0	917 1942	1 1	1.9	1834	3883
120 890	1190	1120	2000	2000	4000 13	1300 6	62 13	1362 24	2400 3	330 2.	2730 28	2850 13	1360 42	4210	1	1.0	917 1942	1 1	1.9	1834	3883
134 1000	1340	1250	2000	7000	4000 13	1300 6	62 13	1362 24	2400 3	330 2.	2730 3.	3100 13	1360 4	4460	2	1.9 18	1834 3883	33 3	2.8	2750	5824
1120	1500	1400	2000	2000	4000 13	1300 6	62 13	1362 24	2400 3	330 2.	2730 33	3300 13	1360 46	4660	2	1.9	1834 3883	33 3	2.8	2750	5824
1280	1710	1600	2200	2000	4200 13	1300 6	62 13	1362 24	2400 3	330 2.	2730 3	3500 13	1360 48	4860	2	1.9 18	1834 3883	33 3	2.8	2750	5824
180 1360	1820	1700	2200	2000	4200 13	1300 6	62 13	1362 24	2400 3	330 2.	2730 3.	3700 17	1740 54	5440	2	1.9 18	1834 3883	33 3	2.8	2750	5824
1440	1930	1800	2200	2400	4600 13	1300 6	62 13	1362 24	2400 3	330 2.	2730 40	4000 17	1740 57	5740	7	1.9 18	1834 3883	33 3	2.8	2750	5824
216 1600	2140	2000	2200	2400	4600 13	1300 6	62 13	1362 24	2400 3	330 2.	2730 43	4300 17	1740 60	6040	7	1.9 18	1834 3883	33 3	2.8	2750	5824
240 1800	2410	2250	2200	2400	4600 13	1300 6	62 13	1362 24	2400 3	330 2.	2730 49	4900 30	3020 79	7920	2	1.9 18	1834 3883	33 3	2.8	2750	5824
270 2000	2680	2500	2400	3530	5930 13	1300 6	62 13	1362 24	2400 3	330 2.	2730 50	2000 30	3020 80	8020	7	2.4 23	2334 4942	12 3	3.5	3500	7412
300 2240	3000	7800	2400	3530	5930 13	1300 6	62 13	1362 24	2400 3	370 2.	2770 5	5100 30	3020 81	8120	7	2.4 23	2334 4942	12 3	3.5	3500	7412
336 2520	3370	3150	2400	3530	5930 13	1300 6	62 13	1362 24	2400 3	370 2.	2770 5	5500 30	3020 85	8520	7	2.4 23	2334 4942	12 3	3.5	3500	7412
360 2680	3590	3350	2400	3530	5930 13	1300 6	62 13	1362 24	2400 3	370 2.	2770 56	2650 30	3020 86	8670	7	2.4 23	2334 4942	12 3	3.5	3500	7412
378 2800	3750	3200	2400	3530	5930 13	1300 6	62 13	1362 24	2400 3	370 2.	2770 58	2800 30	3020 88	8820	7	2.4 23	2334 4942	12 3	3.5	3500	7412
420 3200	4280	4000	2400	3530	5930 1	1500 6	62 15	1562 24	2400 3	370 2.)9 0//7	9000	3300 93	9300	3	3.5 35	3500 7412	12 4	4.7	4667	9883
456 3360	4500	4200	2400	3530	5930 15	1500 6	62 15	1562 24	2400 3	370 2.	2770 64	6400 33	3300 97	0026	3	3.5 3.5	3500 7412	12 4	4.7	4667	9883
504 3720	4980	4650	2400	3530	5930 15	1500 6	62 15	1562 24	2400 3	370 2.	2770 68	6800 34	3480 10,	10,280	3	3.5 3.5	3500 7412	12 4	4.7	4667	9883

Table 33 - 10,000V AC Input/Output (54 Pulse Configuration - 27 Power Cells)

Power Rating				(:		_					Cooling Fans			
•	Rating		Width		Depth	ے		Height		Š	Weight (kg)	_		W	_			W2		
	:	-				<u></u>	:	:	:	:	:	:	Number	ĭ	Total Airflow	low	Number	ĭ	Total Airflow	W
윤	KVA	¥	M2	w 	D	۵	Ŧ	2	=	W1	W 5	≥	of Fans	m³/s	s/1	CFM	of Fans	m³/s	r/s	CFM
260	250	2000	2400 4	4400 1300	0 62	1362	2400	330	2730	1700	1740	3440	1	1.0	617	1942	7	1.9	1834	3883
290	280	2000	2400 4	4400 1300	0 62	1362	2400	330	2730	1750	1740	3490	1	1.0	216	1942	7	1.9	1834	3883
330	315	2000	2400 4	4400 1300	0 62	1362	2400	330	2730	1800	1740	3540	1	1.0	617	1942	7	1.9	1834	3883
370	355	2000	2400 4	4400 1300	0 62	1362	2400	330	2730	1850	1740	3590	1	1.0	216	1942	7	1.9	1834	3883
420	400	2000	2400 4	4400 1300	0 62	1362	2400	330	2730	1950	1740	3690	1	1.0	216	1942	7	1.9	1834	3883
480	450	2000	2400 4	4400 1300	0 62	1362	2400	330	2730	2050	1740	3790	1	1.0	216	1942	2	1.9	1834	3883
530	200	2000	2400 4	4400 1300	0 62	1362	2400	330	2730	2150	1740	3890	1	1.0	917	1942	7	1.9	1834	3883
280	260	2000	2400 4	4400 1300	0 62	1362	2400	330	2730	2200	1740	3940	1	1.0	617	1942	7	1.9	1834	3883
0/9	630	2000	2400 4	4400 1300	0 62	1362	2400	330	2730	2250	1740	3990	1	1.0	216	1942	2	1.9	1834	3883
750	710	2000	2400 4	4400 1300	0 62	1362	2400	330	2730	2400	1740	4140	1	1.0	917	1942	7	1.9	1834	3883
850	800	2000	2400 4	4400 1300	0 62	1362	2400	330	2730	2500	1740	4240	1	1.0	617	1942	7	1.9	1834	3883
096	006	2000	2400 4	4400 1300	0 62	1362	2400	330	2730	2700	1740	4440	1	1.0	216	1942	7	1.9	1834	3883
1070	1000	2000	2400 4	4400 1300	0 62	1362	2400	330	2730	2780	1740	4520	1	1.0	216	1942	7	1.9	1834	3883
1190	1120	2000	2400 4	4400 1300	0 62	1362	2400	330	2730	2850	1740	4590	7	1.9	1834	3883	3	2.8	2750	5824
1340	1250	2000	2400 4	4400 1300	0 62	1362	2400	330	2730	3100	1740	4840	7	1.9	1834	3883	3	2.8	2750	5824
1500	1400	7000	2400 4	4400 1300	0 62	1362	2400	330	2730	3300	1740	5040	7	1.9	1834	8883	3	2.8	2750	5824
1710	1600	2200	2400 4	4600 1300	0 62	1362	2400	330	2730	3700	1740	5440	7	1.9	1834	3883	3	2.8	2750	5824
1930	1800	2200	2400 4	4600 1300	0 62	1362	2400	330	2730	4000	1740	5740	7	1.9	1834	3883	3	2.8	2750	5824
2140	2000	2200	2400 4	4600 1300	0 62	1362	2400	330	2730	4300	1740	6040	7	1.9	1834	3883	3	2.8	2750	5824
2460	2300	2200	2400 4	4600 1300	0 62	1362	2400	330	2730	4700	1740	6440	7	1.9	1834	3883	3	2.8	2750	5824
2680	2500	2200	2400 4	4600 1300	79 0	1362	2400	330	2730	4800	1740	6540	7	1.9	1834	8888	3	2.8	2750	5824
3000	2800	2400	4140 6	6540 1300	0 62	1362	2400	370	2770	5100	3210	8310	7	2.4	2334	7464	3	3.5	3500	7412
3210	3000	2400	4140 6	6540 1300	0 62	1362	2400	370	2770	5100	3210	8310	7	2.4	2334	4942	3	3.5	3500	7412
3430	3200	2400	4140 6	6540 1300	0 62	1362	2400	370	2770	2650	3210	0988	7	2.4	2334	4942	3	3.5	3500	7412
3800	3550	2400	4140 6	6540 1300	0 62	1362	2400	370	2770	2800	3210	9010	7	2.4	2334	4942	3	3.5	3500	7412
4280	4000	2400	4890 7.	7290 1500	0 62	1562	2400	370	2770	6350	3980	10,330	3	3.5	3500	7412	9	5.5	2200	11,647
4820	4500	2400	4890 7.	7290 1500	0 62	1562	2400	370	2770	6750	3980	10,730	3	3.5	3500	7412	9	5.5	2200	11,647
5360	2000	2400		7290 1500	0 62	1562	2400	370	2770	0569	3980	10,930	3	3.5	3500	7412	9	5.5	2200	11,647
0009	2600	3000	4890 78	7890 1700	0 62	1762	2700	370	3070	9570	4300	13,870	4	4.7	4667	6883	9	7.0	2000	14,824
0089	6350	3000	4890 78	7890 1700	0 62	1762	2700	370	3070	11,100	4300	15,400	4	4.7	4667	8883	9	7.0	7000	14,824
7500	7000	3000	4890 78	7890 1700	0 62	1762	2700	370	3070	11,800	4700	16,500	2	6.5	5834	12,353	9	7	7000	14,824

Table 34 - 11,000V AC Input / 3300V Output (18 Pulse Configuration - 9 Power Cells)

0 0 0	Jutunit	TvnicalMotor	Motor	Transformer				Dime	Dimensions (mm)	nm)										Cooling Fans	Fans			
An	Amps	Power Rating	Rating	Rating		Width			Depth			Height		W	Weight (kg)	_		W				W2		
	1	7	=	137.0	ş	ş	;	2	2	4	1	1	=	-	4		Number	Tot	Total Airflow	2	Number	Tot	Fotal Airflow	*
	Min.	X X	운	KVA	-	7 M	>	5	7	<u> </u>	Ē	2	-	- E	Z W	٤	Fans	m³/s	L/s	CFM	or Fans	m³/s	L/s	CFM
80	96	360	480	450	2000	1780	3780	1300	62	1362	2400	330	2730	2050	1080	3130	-	1.0	917	1942	2	1.9	1834	3883
06	108	400	530	200	2000	1780	3780	1300	62	1362	2400	330	2730	2150	1080	3230	-	1.0	917	1942	2	1.9	1834	3883
100	120	440	280	260	2000	1780	3780	1300	62	1362	2400	330	2730	2200	1080	3280	-	1.0	917	1942	2	1.9	1834	3883
112	134	200	0/9	630	2000	1780	3780	1300	62	1362	2400	330	2730	2250	1080	3330	1	1.0	917	1942	2	1.9	1834	3883
125	150	995	750	710	2000	1780	3780	1300	62	1362	2400	330	2730	2400	1080	3480	-	1.0	917	1942	2	1.9	1834	3883
140	168	640	850	800	2000	1780	3780	1300	62	1362	2400	330	2730	2450	1080	3530	-	1.0	917	1942	2	1.9	1834	3883
150	180	089	910	850	2000	1780	3780	1300	62	1362	2400	330	2730	7600	1080	3680	-	1.0	917	1942	2	1.9	1834	3883
160	192	720	096	006	2000	1780	3780	1300	62	1362	2400	330	2730	2700	1170	3870	1	1.0	917	1942	2	1.9	1834	3883
180	216	008	1070	1000	2000	1780	3780	1300	62	1362	2400	330	2730	2800	1170	3970	1	1.0	917	1942	2	1.9	1834	3883
200	240	068	1190	1120	2000	1780	3780	1300	62	1362	2400	330	2730	3250	1170	4420	1	1.0	917	1942	7	1.9	1834	3883
225	270	1010	1350	1265	2400	2000	4400	1300	62	1362	2400	330	2730	3500	1360	4860	2	1.9	1834	3883	3	2.8	2750	5824
250	300	1120	1500	1400	2400	2000	4400	1300	62	1362	2400	330	2730	3700	1360	2060	2	1.9	1834	3883	3	2.8	2750	5824
280	336	1260	1680	1575	2400	2000	4400	1300	62	1362	2400	330	2730	3900	1360	5260	2	1.9	1834	3883	3	2.8	2750	5824
300	360	1320	1760	1650	2400	2000	4400	1300	62	1362	2400	330	2730	4000	1360	5360	2	1.9	1834	3883	3	2.8	2750	5824
315	378	1400	1870	1750	2400	2000	4400	1300	62	1362	2400	330	2730	4100	1360	5460	2	1.9	1834	3883	3	2.8	2750	5824
350	420	1560	2090	1950	2400	2000	4400	1300	62	1362	2400	330	2730	4500	1360	2860	2	1.9	1834	3883	3	2.8	2750	5824
380	456	1720	2300	2150	2400	2000	4400	1300	62	1362	2400	330	2730	4700	1360	0909	2	1.9	1834	3883	3	2.8	2750	5824

Table 35 - 11,000V AC Input / 6600V Output (36 Pulse Configuration - 18 Power Cells)

PowerFlex 6000 Dimensions and Weights (For UL)

Overview

Dimen	sions (mm)
W1	Width of Cabinet 1 (Isolation Transformer section)
W2	Width of Cabinet 2 (Power Module section and Low Voltage Control section)
W	Total width
D1	Depth of cabinet base (footprint)
D2	Depth of doors beyond cabinet base
D	Total depth (including door depth)
H1	Height of Cabinet
H2	Height of Fan
Н	Total height (including fan)

Weight	: (kg)
M1	Weight of Cabinet 1 (Isolation Transformer section)
M2	Weight of Cabinet 2 (Power Module section and Low Voltage Control section)
М	Total weight



Table 36 - 2400V Input & 2300/2400V AC Output (18 Pulse Configuration - 9 Power Cells)

1			VIIII (III.)	VIMENSIONS, MIM (IN.)	Dimensions, mm (in.)		ike	ike 3	me Gelli Gelli	me o jit g jire	me og	mei mei og og og og og og og og og og og og og
	Height	Depth Height			Power Cell Width Depth	· Cell Width Depth	टुंचे Number Power (ell Width Depth	Mumber Power (ell Width Depth Depth	Weight Power (ell Width Depth	Mumber Power Cell North Power Cell North Power Cell North Power Cell Satin Structus Code Of Fans Structus Code North Power Cell North Power Ce	Midth Width Width Depth	Power Rain Fransform Midth Power Cell Width Power Code Midth Power Code Rain Power Code Rain Structure Rain Power Code Rain Power Cell Rain Po
.	н н2	D2 D H1	W D1 D2 D H1	D1 D2 D H1	W2a W2b W D1 D2 D H1	mm (in.) W1 W2a W2b W D1 D2 D H1	HxWxD, mm (in.) W1 W2a W2b W D1 D2 D H1	Amps HxWxD, mm (in.) W1 W2a W2b W D1 D2 D H1	kg Amps HxWxD, mm (in.) W1 W2a W2b W D1 D2 D H1	KVA kg Amps HxWxD, mm (in.) W1 W2a W2b W D1 D2 D H1	kg Amps HxWxD, mm (in.) W1 W2a W2b W D1 D2 D H1	Hp kVA kg Amps HxWxD,mm (in.) W1 W2a W2b W D1 D2 D H1
1) 2000 (4409)	380 (15)	62 1362 2300 380 (2.44) (53.6) (90.55) (15)	3550 1300 62 1362 2300 380 (139.76) (51.18) (2.44) (53.6) (90.55) (15) (950 600 3550 1300 62 1362 2300 380 (37.4) (23.62) (139.76) (51.18) (2.44) (53.6) (90.55) (15) (600 3550 1300 62 1362 2300 380 (23.62) (139.76) (51.18) (2.44) (53.6) (90.55) (15) (15)	2-RH45 420x182x597 2000 950 600 3550 1300 62 1362 2300 380 (16.53x7.16x23.5) (78.74) (37.4) (37.4) (13.8.7) (139.76) (51.18) (24.4) (53.6) (90.55) (15)	420x182x597 2000 950 600 3550 1300 62 1362 2300 380 (16.53X.16x23.5) (78.74) (37.4) (23.62) (1139.76) (51.18) (24.4) (53.6) (90.55) (15)	40 STR_9 2-RH45 420x182x597 2000 950 600 3550 1300 62 1362 2300 380 (51.18) (2.44) (53.6) (90.55) (139.76) (51.18) (2.44) (53.6) (90.55) (15) (15)	1000 40 STR_9 2-RH45 420x182x3597 2000 950 600 3550 1300 62 1362 2300 380 (51.18) (21.	250 1000 40 STR_9 2-RH45 420x182x597 2000 950 660 3550 1300 62 1362 2300 380 380 80 80 80 80 80 80 80 80 80 80 80 80 8	1000 40 STR_9 2-RH45 420x182x3597 2000 950 600 3550 1300 62 1362 2300 380 (51.18) (21.	184 250 1000 40 STR_9 2-RH45 420x182x557 2000 950 600 3550 1300 62 1362 2300 380 (51.18) [2.44] [53.6] [90.55]
2400 (4850)	300 380 2680 0.55) (15) (105.51)	62 1362 2300 380 (2.44) (53.6) (90.55) (15)	3550 1300 62 1362 2300 380 (139.76) (51.18) (2.44) (53.6) (90.55) (15)	950 600 3550 1300 62 1362 2300 380 (37.4) (23.62) (139.76) (51.18) (2.44) (53.6) (90.55) (15)	600 3550 1300 62 1362 2300 380 (23.62) (139.76) (51.18) (2.44) (53.6) (90.55) (15) (2-RH45 420x182x597 2000 950 600 3550 1300 62 1362 2300 380 (16.53x7.16x23.5) (78.74) (37.4) (37.4) (33.6) (313.6) (313.6) (30.55) (19) (10.54)	420x182x597 2000 950 600 3550 1300 62 1362 20055) (1853x.16x23.5) (78.74) (37.4) (37.6) (139.76) (51.18) (21.18) (23.6) (90.55) (15)	75 STR_9 2-RH45 420x182x557 2000 950 600 3550 1300 62 1362 2300 380 (51.18) (2.44) (53.6) (90.55) (78.74) (37.4) (37.4) (37.4) (37.4) (37.5) (139.76) (51.18) (2.44) (53.6) (90.55) (15) (15)	1200 75 STR_9 2-RH45 420x182x597 2000 950 600 3550 1300 62 1362 2300 380 (51.18) [23.4] [63.6] [60.55]	400 1200 75 STR_9 2-RH45 420x182x597 2000 950 660 3550 1300 62 1362 2300 380 80 800 850 80 80 80 80 80 80 80 80 80 80 80 80 80	1200 75 STR_9 2-RH45 420x182x597 2000 950 600 3550 1300 62 1362 2300 380 (51.18) [23.4] [63.6] [60.55]	315 400 1200 75 STR_9 2-RH45 420x182x597 2000 950 600 3550 1300 62 1302 2300 380 (51.18) (2.44) (53.6) (90.55) (139.76) (51.18) (2.44) (53.6) (90.55) (139.76)
2500 (5291)	380 2680 (15) (105.51)	62 1362 2300 380 2680 (2.44) (53.6) (90.55) (15) (105.51)	3550 1300 62 1362 2300 380 2680 (139.76) (51.18) (2.44) (53.6) (90.55) (15) (105.51)	950 600 3550 1300 62 1362 2300 380 2680 (37.4) (23.62) (139.76) (51.18) (2.44) (3.6) (90.55) (15) (105.51)	600 3550 1300 62 1362 2300 380 2680 (23.62) (139.76) (51.18) (2.44) (53.6) (90.55) (15) (105.51)	2-RH45 420x182x597 2000 950 600 3550 1300 62 1362 2300 380 2880 (16.53x7.16x23.5) (78.74) (37.4) (37.45) (33.62) (139.76) (51.18) (2.44) (33.6) (90.55) (15) (105.51)	420x182x597 2000 950 600 3550 1300 62 1362 2300 380 2680 165.53x716x23.5 (78.74) (37.4) (23.62) (139.76) (51.18) (2.44) (53.6) (90.55) (15) (105.51)	100 STR_9 2-RH45 420x182x557 2000 950 600 3550 1300 62 1362 2300 380 2680 (16.33x7.16x23.5) (78.74) (37.4) (37.4) (133.6) (139.76) (51.18) (2.44) (35.6) (90.55) (15) (105.51)	1400 100 STR_9 2-RH45 420x182x597 2000 950 600 3550 1300 62 1362 2300 380 2680 (51.18) (2.44) (35.6) (90.55) (105.51)	450 1400 100 STR_9 2-RH45 420x182x597 2000 950 600 3550 1300 62 1362 2300 380 2680 165.181 (16.53x7.16x23.5) (78.74) (37.4) (37.45) (33.62) (139.76) (51.18) (2.44) (33.6) (90.55) (15) (105.51)	1400 100 STR_9 2-RH45 420x182x597 2000 950 600 3550 1300 62 1362 2300 380 2680 (51.18) (2.44) (35.6) (90.55) (105.51)	420 450 1400 100 STR_9 2-RH45 420x182x5357 2000 950 600 3550 1300 62 1362 2300 380 2680 (16.5387.16x23.5) (78.74) (37.4) (23.62) (139.76) (51.18) (2.44) (35.6) (90.55) (15) (105.51)
2600	380 2680 (15) (105.51) (62 1362 2300 380 2680 (2.44) (53.6) (90.55) (15) (105.51)	3550 1300 62 1362 2300 380 2680 (139.76) (51.18) (2.44) (53.6) (90.55) (15) (105.51)	950 600 3550 1300 62 1362 2300 380 2680 (37.4) (23.62) (139.76) (51.18) (2.44) (3.56) (90.55) (15) (105.51)	600 3550 1300 62 1362 2300 380 2680 (23.62) (139.76) (51.18) (2.44) (53.6) (90.55) (15) (105.51)	2-RH45 420x182x597 2000 950 600 3550 1300 62 1362 2300 380 2680 (16.53x7.16x23.5) (78.74) (37.4) (33.62) (139.76) (51.18) (2.44) (33.6) (90.55) (15) (105.51)	STR_9 2-RH45 420x182x597 2000 950 600 3550 1300 62 1362 2300 380 2680 (51.18) (2.44) (53.6) (90.55) (10.551)	100 STR_9 2-RH45 420x182x357 2000 950 600 3550 1300 62 1362 2300 380 2680 (16.53x7.16x23.5) (78.74) (37.4) (37.4) (139.76) (51.18) (2.44) (53.6) (90.55) (15) (105.51)	1500 100 STR_9 2-RH45 420x182x597 2000 950 600 3550 1300 62 1362 2300 380 2680 (1139.76) (51.18) (2.44) (35.6) (9055) (15) (10551)	500 1500 100 STR_9 2-RH45 420x182x597 2000 950 600 3550 1300 62 1362 2300 380 2680 (16.53x7.16x23.5) (78.74) (37.4) (37.45) (33.62) (313.62) (90.55) (15) (105.51)	1500 100 STR_9 2-RH45 420x182x597 2000 950 600 3550 1300 62 1362 2300 380 2680 (1139.76) (51.18) (2.44) (35.6) (9055) (15) (10551)	469 500 1500 100 5TR_9 2-RH45 420x182x357 2000 950 600 3550 1300 62 1362 2300 380 2680 (105571) (105571)
2700	380 2680 (15) (105.51) (62 1362 2300 380 2680 (2.44) (53.6) (90.55) (15) (105.51)	3550 1300 62 1362 2300 380 2680 (139.76) (51.18) (2.44) (53.6) (90.55) (15) (105.51)	950 600 3550 1300 62 1362 2300 380 2680 (37.4) (23.62) (139.76) (51.18) (2.44) (35.6) (90.55) (15) (105.51)	600 3550 1300 62 1362 2300 380 2680 (23.62) (139.76) (51.18) (2.44) (53.6) (90.55) (15) (105.51)	2-RH45 420x18xx597 2000 950 600 3550 1300 62 1362 2300 380 2680 (16.53x7.16x23.5) (78.74) (37.4) (37.45) (13.62) (139.76) (51.18) (2.44) (33.6) (90.55) (15) (105.51)	STR_9 2-RH45 420x182x597 2000 950 600 3550 1300 62 1362 2300 380 2680 (16.53x7.16x23.5) (78.74) (37.4) (37.4) (37.4) (37.8) (139.76) (51.18) (2.44) (35.6) (90.55) (15) (105.51)	120 STR_9 2-RH45 420x182x597 2000 950 600 3550 1300 62 1362 2300 380 2680 (16.53x7.16x23.5) (78.74) (37.4) (23.62) (139.76) (51.18) (2.44) (35.6) (90.55) (15) (105.51)	1600 120 STR_9 2-RH45 420x182x357 2000 950 600 3550 1300 62 1362 2300 380 2680 (10551) (1055X7.16x23.5) (78.74) (37.4) (37.4) (133.6) (1139.76) (51.18) (2.44) (35.6) (90.55) (15) (10551)	600 1600 120 STR_9 2-RH45 420x182x597 2000 950 600 3550 1300 62 1362 2300 380 2680 (16.53x7.16x23.5) (78.74) (37.4) (37.45) (139.76) (139.76) (51.18) (2.44) (33.6) (90.55) (15) (105.51)	1600 120 STR_9 2-RH45 420x182x357 2000 950 600 3550 1300 62 1362 2300 380 2680 (10551) (1055X7.16x23.5) (78.74) (37.4) (37.4) (133.6) (1139.76) (51.18) (2.44) (35.6) (90.55) (15) (10551)	522 600 1600 120 STR_9 2-RH45 420x182x597 2000 950 600 3550 1300 62 1362 2300 380 2680 (16.53x7.16x23.5) (78.74) (37.4) (23.62) (139.76) (51.18) (2.44) (35.6) (90.55) (15) (105.51)
2800 1360 (5952) (2998)	380 2680 2800 (15) (105.51)	62 1362 2300 380 2680 2800 (2.44) (33.6) (90.55) (15) (15) (105.51)	3550 1300 62 1362 2300 380 2680 2800 (139.76) (51.18) (2.44) (53.6) (90.55) (15) (105.51) (5952)	950 600 3550 1300 62 1362 2300 380 2680 2800 (37.4) (35.62) (139.76) (51.18) (2.44) (33.6) (90.55) (15) (105.51) (5952)	600 3550 1300 62 1362 2300 380 2680 2800 (23.62) (139.76) (51.18) (2.44) (3.56) (90.55) (15) (105.51) (9952)	2-RH45 420x18xx597 2000 950 600 3550 1300 62 1362 2300 380 2680 2800 (16.53x7.16x23.5) (78.74) (37.4) (33.62) (139.76) (51.18) (2.44) (33.6) (90.55) (15) (10.55) (10.55) (50.51)	STR_9 2-RH45 420x182x597 2000 950 600 3550 139 62 1382 2300 380 2680 2800 (51.18) (2.44) (53.6) (90.55) (105.51) (105.51) (59.51)	150 STR_9 2-RH45 420x182x557 2000 950 600 3550 1300 62 1362 2300 380 2680 2800 (16.33x7.16x23.5) (78.74) (37.4) (37.4) (139.76) (51.18) (24.4) (53.6) (90.55) (15) (105.51) (59.5)	1700 150 51R_9 2-RH45 420x182x557 2000 950 600 3550 1300 62 1362 2300 380 2680 2800 (51.18) (2.44) (53.6) (90.55) (105.51) (105.51) (59.51)	700 1700 150 STR_9 2-RH45 420x182x597 2000 950 600 3550 1300 62 1362 2300 380 2600 551 (23.0) (51.18) (24.0) (51.18) (24.0) (51.18) (24.0) (51.18) (24.0) (51.18) (24.0) (51.18) (24.0)	1700 150 51R_9 2-RH45 420x182x557 2000 950 600 3550 1300 62 1362 2300 380 2680 2800 (51.18) (2.44) (53.6) (90.55) (105.51) (105.51) (59.51)	629 700 1700 150 SIR_9 2-RH45 420x182x357 2000 950 660 33550 [31.04] (16.33x7.16x23.5) (78.74) (37.4) (37.4) (139.76) (51.18) (24.4) (53.6) (90.55) (15) (105.51) (105.51) (59.5)
2900 1450 4350 (6172) (3196) (9368)	340 2640 2900 1450 (13.4) (103.94) (6172) (3196)	(2.44) (53.6) (90.55) (13.4) (103.94) (6172) (3196)	3790 1300 62 1362 2300 340 2640 2900 1450 (149.21) (51.18) (2.44) (53.6) (90.55) (13.4) (103.94) (6172) (3196)	1190 600 3790 1300 62 1362 2300 340 2640 2900 1450 (46.85) (23.62) (149.21) (51.18) (2.244) (33.6) (90.55) (13.4) (103.94) (6172) (3196)	600 3790 1300 62 1362 2300 340 2640 2900 1450 (23.62) (149.21) (51.18) (2.44) (53.6) (90.55) (13.4) (103.94) (6172) (3196)	4-RH40 420x262x619 2000 1190 600 3790 1300 62 1362 2300 340 2640 2900 1450 146.53x10.31x24.37) (78.74) (46.85) (23.62) (149.21) (51.18) (51.18) (53.6) (90.55) (13.4) (103.94) (617.2) (3196)	STR_10 4-RH40 420x26x8619 2000 1190 600 3790 1300 62 1362 2300 340 2640 2900 1450 14921) (51.18) (2.44) (53.6) (90.55) (13.4) (103.94) (61.29) (61.20) (149.21) (51.18) (2.44) (53.6) (90.55) (13.4) (103.94) (61.20) (61.20)	180 STR_10 4-RH40 420x262x619 2000 1190 600 3790 1300 62 1362 2300 340 2640 2900 1450 146.85 (23.62) (149.21) (51.18) (2.44) (53.6) (90.55) (13.4) (103.94) (61.29) (61.22) (61.22) (61.22)	1800 180 SIR_10 4-RH40 420x26xx619 2000 1190 600 3790 1300 62 1362 2300 340 2640 2900 1450 (16.53x10.31x24.37) (78.74) (46.85) (23.62) (149.21) (51.18) (2.44) (53.6) (90.55) (13.4) (103.94) (6172) (3196)	800 1800 180 51R_10 4-RH40 420x262x619 2000 1130 660 3790 1300 62 1362 200 340 250 360 1450 (149,21) (21.18) (1800 180 SIR_10 4-RH40 420x26xx619 2000 1190 600 3790 1300 62 1362 2300 340 2640 2900 1450 (16.53x10.31x24.37) (78.74) (46.85) (23.62) (149.21) (51.18) (2.44) (53.6) (90.55) (13.4) (103.94) (6172) (3196)	730 800 1800 180 STR_10 4-RH40 420\(26.2\times\)2\(
3000 1450 4450 3365.4 (6393) (3196) (9589)	340 2640 3000 1450 4450 (13.4) (103.94) (6393) (3196) (9589)	62 1362 2300 340 2640 3000 1450 4450 (2.44) (3.5.6) (9.0.55) (13.4) (103.94) (6393) (3196) (9589)	3790 1300 62 1362 2300 340 2640 3000 1450 4450 (149.21) (51.18) (2.44) (53.6) (90.55) (13.4) (103.94) (6393) (3196) (9589)	1190 660 3790 1300 62 1362 2300 340 2640 3000 1450 4450 (46.85) (23.62) (149.21) (51.18) (2.44) (53.6) (90.55) (13.4) (103.94) (6393) (3196) (9589)	600 3790 1300 62 1362 2300 340 2640 3000 1450 4450 (23.62) (149.21) (51.18) (2.44) (53.6) (90.55) (13.4) (103.94) (6393) (3196) (9589)	4-RH40 420x26xe19 2000 1130 600 3790 1300 62 1362 2300 340 2640 3000 1450 4450 (146.53) (149.21) (51.18) (2.44) (53.6) (90.55) (13.4) (103.94) (6393) (3196) (9589)	STR_10 4-RH40 420x262x619 2000 1190 600 3790 1300 62 1362 3300 340 2640 3000 1450 4450 (16.53x10.31x24.37) (78.74) (46.85) (23.6.2) (149.21) (51.18) (2.44) (53.6) (90.55) (13.4) (103.94) (639.3) (3196) (9589)	180 STR_10 4-RH40 420x26x619 2000 1190 600 3790 1300 62 1362 3300 340 2640 3000 1450 4450 (46.85) (18.42) (18.18) (2.44) (33.6) (90.55) (13.44) (103.94) (6393) (3196) (9589)	1900 180 STR_10 4-RH40 420x26x619 2000 1190 600 3790 1300 62 1362 3300 340 2640 3000 1450 4450 (8589) (35.62) (146.25) (149.21) (51.18) (2.44) (53.6) (90.55) (13.44) (103.94) (6393) (3196) (9589)	900 1900 180 SIR_10 4-RH40 420x26xe19 2000 1130 600 3790 1300 62 1362 2300 340 2640 3000 1450 4450 4450 1 (140.21) (51.18) (2.44) (53.6) (90.55) (13.4) (103.94) (6393) (3196) (9589)	1900 180 STR_10 4-RH40 420x26x619 2000 1190 600 3790 1300 62 1362 3300 340 2640 3000 1450 4450 (8589) (35.62) (146.25) (149.21) (51.18) (2.44) (53.6) (90.55) (13.44) (103.94) (6393) (3196) (9589)	839 900 1900 180 5TR_10 4-RH40 42022624619 2000 1190 600 3790 1300 62 1362 2300 340 2640 3000 1450 4450 80
1450	340 2640 3100 1450	62 1362 2300 340 2640 3100 1450	3790 1300 62 1362 2300 340 2640 3100 1450	1190 600 3790 1300 62 1362 2300 340 2640 3100 1450	2000 1190 660 3790 1300 62 1362 2300 340 2640 3100 1450	4-RH40 420x262x619 2000 1190 600 3790 1300 62 1362 2300 340 2640 3100 1450	STR 10 4-RH40 420x262x619 2000 1190 600 3790 1300 62 1362 2300 340 2640 3100 1450	200 STR 10 4-RH40 420x262x619 2000 1190 600 3790 1300 62 1362 2300 340 2640 3100 1450	2000 200 STR 10 4-RH40 420x262x619 2000 1190 600 3790 1300 62 1362 2300 340 2640 3100 1450	1000 2000 200 STR 10 4-RH40 420x262x619 2000 1190 600 3790 1300 62 1362 2300 340 2640 3100 1450	2000 200 STR 10 4-RH40 420x262x619 2000 1190 600 3790 1300 62 1362 2300 340 2640 3100 1450	941 1000 2000 STR 10 4-RH40 420x26x619 2000 1190 600 33790 1300 62 1362 2300 340 2640 3100 1450
M1 (4409) (4409) (4409) (4409) (4500) (5211)	Height H2 H2 H3 380 (15) (15) (15) (15) (15) (15) (15) (15)	Depth Height D2 D H1 H2 62 1362 2300 380 62 1363 90553 (15) 62 1362 2300 380 62 1363 90553 (15) 62 1362 2300 380 62 1363 90553 (15) 62 1363 90553 (15) 62 1362 2300 380 62 1363 90553 (15) 62 1362 2300 380 62 1362 2300 380 62 1363 90553 (15) 62 1362 2300 340 62 1362 2300 340 62 1363 90553 (134) 62 1363 90553 (134) 62 1363 90553 (134) 62 1363 90553 (134)	W D1 D2 H Height 3550 1300 62 1362 2300 380 (139.76) (51.18) (2.44) (33.6) (90.55) (15) 3550 1300 62 1362 2300 380 (139.76) (51.18) (2.44) (33.6) (90.55) (15) 3550 1300 62 1362 2300 380 (139.76) (51.18) (2.44) (33.6) (90.55) (15) 3550 1300 62 1362 2300 380 (139.76) (51.18) (2.44) (33.6) (90.55) (15) 3550 1300 62 1362 2300 380 (139.76) (51.18) (2.44) (33.6) 90.55) (15) 3550 1300 62 1362 2300 340 (149.21) (51.18) (2.44) (33.6) 90.55) (13.4) 3790 13	Width Depth Height WZa WZb W D1 D2 D HT H2 950 600 3550 1300 62 1362 2300 380 950 600 3550 1300 62 1362 2300 380 950 600 3550 1300 62 1362 2300 380 950 600 3550 1300 62 1362 2300 380 950 600 3550 1300 62 1362 2300 380 37.4) (23.62) (139.76) (51.18) (244) (35.6) (955) (15) 950 600 3550 1300 62 1362 2300 380 950 600 3550 1300 62 1362 330 15) 950 600 3550 1300 62 1362 330 15) 950 600 <td>Height Midth Midth Depth Height Hewkno, mm (in.) W1 W2 W2b W D1 D2 D H1 H2 420x182x597 2000 950 600 3550 1300 62 1362 2300 380 (16.53x7.16x23.5) 7/8.74 (37.4) (32.62) 139.76 (51.18) (244) (35.6) 6055) (13) 420x182x597 2000 950 600 3550 1300 62 1362 2300 380 (16.53x7.16x23.5) 7/8.74 (37.4) (23.62) 139.76 (51.18) (244) (35.6) (95.5) (13) (13.62 1300 80 (16.53x7.16x23.5) 7/8.74 (37.4) (32.62) (139.76) (51.18) (244) (35.6) (95.5) (13) (45.85) (13) (45.85) (13) (45.85) (13) (45.85) (13) (45.85) (13) (45.85) (13.62 3.00 380</td> <td>of Fans Power Cell Width Width Pipeth Height 2-RH45 HXWbD, mm (in.) W1 W2a W2b W D1 D2 D H1 H2 2-RH45 420x182x597 2000 950 600 3550 1300 62 1362 2300 380 2-RH45 420x18x2597 2000 950 600 3550 1300 62 1362 2300 380 2-RH45 420x18x2597 2000 950 600 3550 1300 62 1362 2300 380 2-RH45 420x18x2597 2000 950 600 3550 1300 62 1362 2300 380 2-RH45 420x18x2597 2000 950 600 3550 1300 62 1362 130 62 136 155 155 155 155 155 155 155 155 155 155 155 155 155 155</td> <td> Fig. 2 Or Fan Flower Cell W1 W2a W2b W D1 D2 D2 H1 H2 H2 H4 H4 H4 H4 H4 H4</td> <td> Midth Midt</td> <td> Mail Mail </td> <td> Harden H</td> <td> Height Height High Hig</td> <td> Height H</td>	Height Midth Midth Depth Height Hewkno, mm (in.) W1 W2 W2b W D1 D2 D H1 H2 420x182x597 2000 950 600 3550 1300 62 1362 2300 380 (16.53x7.16x23.5) 7/8.74 (37.4) (32.62) 139.76 (51.18) (244) (35.6) 6055) (13) 420x182x597 2000 950 600 3550 1300 62 1362 2300 380 (16.53x7.16x23.5) 7/8.74 (37.4) (23.62) 139.76 (51.18) (244) (35.6) (95.5) (13) (13.62 1300 80 (16.53x7.16x23.5) 7/8.74 (37.4) (32.62) (139.76) (51.18) (244) (35.6) (95.5) (13) (45.85) (13) (45.85) (13) (45.85) (13) (45.85) (13) (45.85) (13) (45.85) (13.62 3.00 380	of Fans Power Cell Width Width Pipeth Height 2-RH45 HXWbD, mm (in.) W1 W2a W2b W D1 D2 D H1 H2 2-RH45 420x182x597 2000 950 600 3550 1300 62 1362 2300 380 2-RH45 420x18x2597 2000 950 600 3550 1300 62 1362 2300 380 2-RH45 420x18x2597 2000 950 600 3550 1300 62 1362 2300 380 2-RH45 420x18x2597 2000 950 600 3550 1300 62 1362 2300 380 2-RH45 420x18x2597 2000 950 600 3550 1300 62 1362 130 62 136 155 155 155 155 155 155 155 155 155 155 155 155 155 155	Fig. 2 Or Fan Flower Cell W1 W2a W2b W D1 D2 D2 H1 H2 H2 H4 H4 H4 H4 H4 H4	Midth Midt	Mail	Harden H	Height Height High Hig	Height H

Table 37 - 4160V Input & 4000/4160V AC Output (24 Pulse Configuration - 12 Power Cells)

						ner t		9.						Δi	Dimensions, mm (in.)	mm (in.									W				×	W2	
Catalog Number	Moto	Motor Amps	Typical Mo	Power Rat	rrotznerT pniteA	Transforr Meigh	Power C gniteA	utsurte ebo2	Number of Fans	Power Cell		Wik	Width			Depth		_	Height		Weig	Weight, kg (lbs)	1	tiement Tial letr Tedmu	sn611	Total A	fotal Airflow	umber 2 Fans		iotal Airflow	wo
	Cont.	1 Min.	kW	Нр	KVA	kg	Amps			HxWxD, mm (in.)	W1	W2a	W2b	W	10	D2	۵	돠	Н2	=	M1	M2	S	oT	0	m³/s L	L/s dm	N	m ³ /s	s/ı	-tj
6000U-A37DE-AJ6E	39	44	225	300	300	1200	40	STR_6	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1190 (46.85)	600 (23.62)	3790 (149.21)	1300 (51.18)	62 (2.44)	1362 2 (53.6) (9	2300 (30.55)	340 (13.4) (1	2640 (103.94)	2200 (4840) (1480 (3256) (6	3680 1 ⁷ (8096)	1121.8	1	1 9.	917 1942	12 2	1.9	1834	3883
6000U-A49DE-AJ6E	49	85	300	400	400	1400	75	STR_6	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1190 (46.85)	600 (23.62)	3790 (149.21)	1300 (51.18)	62 (2.44)	1362 2 (53.6) (9	2300 (30.55)	340 (13.4) (1	2640 (103.94)	2400 (5280) (1480 (3256) (i	3880 1 ⁴ (8536)	1495.8	1	1 9.	917 1942	12 2	1.9	1834	3883
6000U-A55DE-AJ6E	55	99	335	450	450	1500	75	STR_6	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1190 (46.85)	600 (23.62)	3790 (149.21)	1300 (51.18)	62 (2.44)	1362 2 (53.6) (9	2300 (90.55)	340 (13.4)	2640 (103.94)	2500 (5500) (1480 (3256) (i	3980 16 (8756)	1682.7	-	1 9.	917 1942	12 2	1.9	1834	3883
6000U-A61DE-AJ6E	61	73	373	200	200	1600	75	STR_6	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1190 (46.85)	600 (23.62)	3790 (149.21)	1300 (51.18)	62 (2.44)	1362 2 (53.6) (9	2300 (30.55)	340 (13.4)	2640 (103.94) (2600 (5720)	1480 . (3256) (i	4080 18 (8976)	1869.7	-	1 9.	917 1942	12 2	1.9	1834	3883
6000U-A74DE-AJ6E	74	88	450	009	009	1700	75	STR_6	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1190 (46.85)	600 (23.62)	3790 (149.21)	1300 (51.18)	62 (2.44)	1362 2 (53.6) (9	2300 (30.55)	340 (13.4)	2640 (103.94)	2700 (5940) (1480 (3256)	4180 Zi (9196)	2243.6	-	1 9.	917 1942	12 2	1.9	1834	3883
6000U-A86DE-AJ6E	98	103	522	002	700	1800	100	STR_6	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1190 (46.85)	600 (23.62)	3790 (149.21)	1300 (51.18)	62 (2.44)	1362 2 (53.6) (9	2300 (30.55)	340 (13.4) (1	2640 (103.94)	2800 (6160)	1480 . (3256) (9	4280 26 (9416)	2617.6	1	1 9.	917 1942	12 2	1.9	1834	3883
6000U-A99DE-AJ6E	66	118	009	800	800	1900	100	STR_6	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1190 (46.85)	600 (23.62)	3790 (149.21)	1300 (51.18)	62 (2.44)	1362 2 (53.6) (9	2300 (30.55)	340 (13.4)	2640 (103.94)	2900 (6380)	1480 (3256)	4380 29 (9636)	2991.5	-	1 9.	917 1942	12 2	1.9	1834	3883
6000U-A110DE-AJ6E	110	132	0/9	006	900	2000	120	STR_7	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1190 (46.85)	600 (23.62)	3790 (149.21)	1300 (51.18)	62 (2.44)	1362 2 (53.6) (9	2300 (30.55)	340 (13.4) (1	2640 (103.94)	3000)	1480 (3256) (9	4480 33 (9856)	3365.4	2 1	1.9 18	1834 3883	33 2	1.9	1834	3883
6000U-A123DE-AJ6E	123	147	052	1000	1000	2100	150	STR_7	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1190 (46.85)	600 (23.62)	3790 (149.21)	1300 (51.18)	62 (2.44)	1362 2 (53.6) (9	2300 (30.55)	340 (13.4)	2640 (103.94)	3100 (6820)	1480 (3256) (1	4580 3; (10076)	3739.4	2 1	1.9	1834 3883	33 2	1.9	1834	3883
6000U-A135DE-AJ6E	135	162	820	1100	1100	2200	150	STR_7	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1190 (46.85)	600 (23.62)	3790 (149.21)	1300 (51.18)	62 (2.44)	1362 2 (53.6) (9	2300 (30.55)	340 (13.4)	2640 (103.94)	3200 (7040)	1480 (3256) (1	4680 47 (10296)	4113.3	2 1	1.9 18	1834 3883	33 2	1.9	1834	3883
6000U-A145DE-AJ6E	145	174	880	1180	1180	2300	150	STR_7	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1190 (46.85)	600 (23.62)	3790 (149.21)	1300 (51.18)	62 (2.44)	1362 2 (53.6) (9	2300 (30.55)	340 (13.4) (1	2640 (103.94)	3300 (7260) (1480 (3256)	4780 44 (10516)	4412.5	2 1	1.9 18	1834 3883	33 2	1.9	1834	3883
6000U-A153DE-AJ6E	153	183	933	1250	1250	2350	180	STR_8	4-RH40	420x262x619 (16.53x10.31x24.37)	2200 (86.61)	1580 (62.2)	600 (23.62)	4380 (172.44)	1300 (90.55)	62 (2.44)	1362 2 (53.6) (9	2300 (200.55)	340 (13.4)	2640 (103.94)	3400 (7480) (1600 (3520)	5000 46 (11000)	4674.2	2 1	1.9 18	1834 3883	33 2	1.9	1834	3883
6000U-A159DE-AJ6E	159	190	026	1300	1300	2500	180	STR_8	4-RH40	420x262x619 (16.53x10.31x24.37)	2200 (86.61)	1580 (62.2)	600 (23.62)	4380 (172.44)	1300 (90.55)	62 (2.44)	1362 2 (53.6) (9	2300 (30.55)	340 (13.4) (1	2640 (103.94)	3550 (7810)	1600 (3520)	5150 48 (11330)	4861.2	2 1	1.9 18	1834 3883	33 2	1.9	1834	3883
6000U-A184DE-AJ6E	184	220	1120	1500	1500	2600	200	STR_8	4-RH40	420x262x619 (16.53x10.31x24.37)	2200 (86.61)	1580 (62.2)	600 (23.62)	4380 (172.44)	1300 (90.55)	62 (2.44)	1362 (53.6)	2300 (30.55)	340 (13.4) (1	2640 (103.94)	3650 (8030) (1600 (3520)	5250 56 (11550)	5609.1	2 1	1.9 18	1834 3883	33 2	1.9	1834	3883
6000U-A200DE-AJ6E	500	240	1220	1635	1635	2800	200	STR_8	4-RH40	420x262x619 (16.53x10.31x24.37)	2200 (86.61)	1580 (62.2)	600 (23.62)	4380 (172.44)	1300 (90.55)	62 (2.44)	1362 7 (53.6) (9	2300 (30.55)	340 (13.4)	2640 (103.94)	3850 (8470) (1600 (3520)	5450 6 ⁻ (11990)	6113.9	2 1	1.9 18	1834 3883	33 2	1.9	1834	3883

Table 38 - 6600V Input & 6000V AC Output (36 Pulse Configuration - 18 Power Cells)

Table 39 - 6600V Input & 6300V AC Output (36 Pulse Configuration - 18 Power Cells)

	Total Airflow	L/s cfm	1834 3883	1834 3883	1834 3883	1834 3883	1834 3883	1834 3883	1834 3883	1834 3883	1834 3883	2750 5824	2750 5824	2750 5824	2750 5824	2750 5824	2750 5824	2750 5824	2750 5824	7750 5834
W2	Tot	m³/s	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
	raber 1 Fans		2	2	2	2	2	2	2	2	2	m	3	m	3	3	3	~	2	~
	low	cfm	1942	1942	1942	1942	1942	1942	3883	3883	3883	3883	3883	3883	3883	5824	5824	5824	5824	1697
	Total Airflow	s/l	917	917	917	917	917	917	1834	1834	1834	1834	1834	1834	1834	2750	2750	2750	2750	2750
W1		m³/s	-	-	-	-	-	-	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.8	2.8	2.8	2.8	3.8
	nmber f Fans		-	-	-	-	-	-	2	2	2	2	2	2	2	æ	e .	e .	e .	~
	trement TiA lete		1495.8	1682.7	1869.7	2243.6	2617.6	2991.5	3365.4	3739.4	4113.3	4674.2	4861.2	5609.1	6113.9	6543.9	7478.8	8413.6	8787.5	N CC70
	(Sq.	W	4320 (9504)	4420 (9724)	4520 (9944)	4620 (10164)	4720 (10384)	4820 (10604)	4920 (10824)	5020 (11044)	5120 (11264)	5320 (11704)	5470 (12034)	5570 (12254)	5770 (12694)	5970 (13134)	6160 (13552)	6260 (13772)	6740 (14828)	7740
	Weight, kg (lbs)	M2	1920 (4224)	1920 (4424)	1920 (4224)	1920 (4224)	1920 (4224)	1920 (4224)	1360 (2992)	1360 (2992)	1740 (3828)	1740								
	Wei	M1	2400 (5280)	2500 (5500)	2600 (5720)	2700 (5940)	2800 (6160)	2900 (6380)	3000 (6600)	3100 (6820)	3200 (7040)	3400 (7480)	3550 (7810)	3650 (8030)	3850 (8470)	4050 (8910)	4800 (10560)	4900 (10780)	5000 (11000)	0009
		=	2640 (103.94)	2640 (103.94)	2640 (103.94)	2640														
	Height	H2	340 (13.4)	340 (13.4)	340 (13.4)	340 (13.4) (340 (13.4)	340 (13.4) (340 (13.4) (340 (13.4)	340 (13.4)	340 (13.4)	340 (13.4)	340 (13.4) (340 (13.4)	340 (13.4)	340 (13.4)	340 (13.4)	340 (13.4)	340
		H	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300
~·		٥	1362 (53.6)	1362 (53.6)	1362 (53.6)	1362														
mm (jr	Depth	D2	62 (2.44)	62 (2.44)	62 (2.44)	62 (2.44)	62 (2.44)	62 (2.44)	62 (2.44)	62 (2.44)	63									
Dimensions, mm (in.)	_	D1	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300
Dime		Μ	4320 (170.08)	4520 (177.95)	4320 (170.08)	4320 (170.08)	4320 (170.08)	4320 (170.08)	5200 (204.72)	5200 (204.72)	5200 (204.72)	5200								
	Vidth	W2b	600 (23.62)	600 (23.62)	600 (23.62)	600 (23.62)	600 (23.62)	600 (23.62)	600 (23.62)	600 (23.62)	600 (23.62)	600 (23.62)	600 (23.62)	600 (23.62)	600 (23.62)	600 (23.62)	600 (23.62)	600 (23.62)	600 (23.62)	900
		W2a	1720 (67.72)	1720 (67.72)	1720 (67.72)	1720 (67.72)	1720 (67.72)	1720 (67.72)	1720 (67.72)	1720 (67.72)	1720 (67.72)	1720 (67.72)	1720 (67.72)	1720 (67.72)	1720 (67.72)	1720 (67.72)	2200 (86.61)	2200 (86.61)	2200 (86.61)	0000
		W1	2000 (78.74)	2000 (78.74)	2000 (78.74)	2000 (78.74)	2000 (78.74)	2000 (78.74)	2000 (78.74)	2000 (78.74)	2000 (78.74)	2200 (86.61)	2200 (86.61)	2200 (86.61)	2200 (86.61)	2200 (86.61)	2400 (94.49)	2400 (94.49)	2400 (94.49)	2400
	Power Cell	HxWxD, mm (in.)	420x182x597 (16.53x7.16x23.5)	420x262x619 (16.53x10.31x24.37)	420x262x619 (16.53x10.31x24.37)	420x262x619 (16.53x10.31x24.37)	420x262x619													
	Number of Fans		3-RH40	3-RH40	3-RH40	3-RH40	3-RH40	3-RH40	4-RH40	4-RH40	4-RH40	5-RH40	5-RH40	5-RH40	5-RH40	6-RH40	6-RH40	6-RH40	6-RH40	6-RH40
e,	opo)		STR_1	STR_1	STR_1	STR_1	STR_1	STR_1	STR_3	STR_3	STR_3	STR_4	STR_4	STR_4	STR_4	STR_5	STR_2	STR_2	STR_2	CTR 2
	O vewo9 gni368	Amps	40	40	40	75	75	75	75	100	100	100	120	120	150	150	180	180	200	200
	Transforr Meigh	kg	1400	1500	1600	1700	1800	1900	2000	2100	2200	2350	2500	7600	2800	3000	3700	3800	3900	4900
	rrotznarT gnitaA	KVA	400	450	200	009	200	800	006	1000	1100	1250	1300	1500	1635	1750	2000	2250	2350	0096
	Power Ra	Нр	384	429	477	576	899	768	857	096	1049	1194	1241	1433	1561	1663	1919	1 2150	3 2243	7487
10J	~ • Typical Mo	n. kW	286	320	356	430	498	573	640	716	783	891	926	1069	1165	1241	1432	1604	1673	1852
	Motor Amps	t. 1 Min.	37	42	46	95	64	74	82	6 93	102	116	0 120	5 139	5 151	2 162	2 186	4 208	2 218	740
		Cont.	Н 31	Н 35	Н 39	Н 47	Н 54	Н 62	69 н	Н 78	Н 85	16 Н	100 H	H 116	н 126	H 135	H 155	174	H 182	00C H
	Catalog Number		6000U-A31DJ-AJ6H	6000U-A35DJ-AJ6H	6000U-A39DJ-AJ6H	6000U-A47DJ-AJ6H	6000U-A54DJ-AJ6H	6000U-A62DJ-AJ6H	6000U-A69DJ-AJ6H	6000U-A78DJ-AJ6H	6000U-A85DJ-AJ6H	6000U-A97DJ-AJ6H	6000U-A100DJ-AJ6H	6000U-A116DJ-AJ6H	6000U-A126DJ-AJ6H	6000U-A135DJ-AJ6H	6000U-A155DJ-AJ6H	6000U-A174DJ-AJ6H	6000U-A182DJ-AJ6H	600011-A200D1-A16H

Table 40 - 6600V Input & 6600V AC Output (36 Pulse Configuration - 18 Power Cells)

	M0	æ	3883	3883	3883	3883	3883	3883	3883	3883	3883	5824	5824	5824	5824	5824	5824	5824	5824	
	Total Airflow	L/s	1834	1834	1834	1834	1834	1834	1834	1834	1834	2750	2750	2750	2750	2750	2750	2750	2750	
W2	Tota	m³/s	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	l
	raber Fans	.0	2	2	2	2	2	2	2	2	2	e .	3	e .	m m	8	e .	m m	8	İ
	Ņ	cfm	1942	1942	1942	1942	1942	1942	3883	3883	3883	3883	3883	3883	3883	5824	5824	5824	5824	İ
	Total Airflow	r/s	917	917	917	917	917	917	1834	1834	1834	1834	1834	1834	1834	2750	2750	2750	2750	İ
W1	Tota	m³/s	-	-	-	-	-	-	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.8	2.8	2.8	2.8	
	raber Fans		-	1	1	-	-	-	2	2	2	2	2	2	2	3	3	3	3	
	irement tal Air		1495.8	1682.7	1869.7	2243.6	2617.6	2991.5	3365.4	3739.4	4113.3	4674.2	4861.2	5609.1	6113.9	6543.9	7478.8	8413.6	8787.5	
	(sql	M	4320 (9504)	4420 (9724)	4520 (9944)	4620 (10164)	4720 (10384)	4820 (10604)	4920 (10824)	5020 (11044)	5120 (11264)	5320 (11704)	5470 (12034)	5570 (12254)	5770 (12694)	5970 (13134)	6160 (13552)	6260 (13772)	6740 (14828)	
	Weight, kg (lbs)	M2	1920 (4224)	1920 (4424)	1920 (4224)	1920 (4224)	1920 (4224)	1920 (4224)	1360 (2992)	1360 (2992)	1740 (3828)									
	Wei	M1	2400 (5280)	2500 (5500)	2600 (5720)	2700 (5940)	2800 (6160)	2900 (6380)	3000	3100 (6820)	3200 (7040)	3400 (7480)	3550 (7810)	3650 (8030)	3850 (8470)	4050 (8910)	4800 (10560)	4900 (10780)	5000 (11000)	
		=	2640 (103.94)	2640 (103.94)	2640 (103.94)															
	Height	Н2	340 (13.4) (340 (13.4) (7	340 (13.4) (7	340 (13.4) (340 (13.4) (7	340 (73.4)	340 (13.4) (7	340 (13.4) (1	340 (13.4) (1	340 (13.4) (1	340 (73.4)	340 (73.4)	340 (13.4) (7	340 (13.4) (7	340 (73.4)	340 (13.4) (7	340 (13.4) (7	l
		Ŧ	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300 (90.55)	2300 (90.55)	I
		٥	1362 (53.6)	1362 (53.6)	1362 (53.6)															
nm (in.	Depth	D2	62 (2.44)	62 (2.44)	62 (2.44)	62 (2.44)	62 (2.44)	62 (2.44)	62 (2.44)	62 (2.44)	62 (2.44)	62 (2.44)	62 (2.44)	62 (2.44)	62 (2.44)	62 (2.44)	62 (2.44)	62 (2.44)	62 (2.44)	
Dimensions, mm (in.)		10	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300 (51.18)	1300 (51.18)	I
Dime		Μ	4320 (170.08)	4320 (170.08)	4320 (170.08)	4320 (170.08)	4320 (170.08)	4320 (170.08)	4320 (170.08)	4320 (170.08)	4320 (170.08)	4520 (177.95)	4320 (170.08)	4320 (170.08)	4320 (170.08)	4320 (170.08)	5200 (204.72)	5200 (204.72)	5200 (204.72)	I
	Width	WZb	600 (23.62)	600 (23.62)	600 (23.62)	600 (23.62)	600 (23.62)	600 (23.62) (600 (23.62)	600 (23.62)	600 (23.62)	600 (23.62)	600 (23.62)	600 (23.62) (600 (23.62)	600 (23.62)	600 (23.62)	600 (23.62)	600 (23.62)	l
	Wid	WZa	1720 (67.72)	1720 (67.72)	1720 (67.72)	1720 (67.72)	1720 (67.72)	1720 (67.72)	1720 (67.72)	1720 (67.72)	1720 (67.72)	1720 (67.72)	1720 (67.72)	1720 (67.72)	1720 (67.72)	1720 (67.72)	2200 (86.61)	2200 (86.61) (2200 (86.61)	İ
		W1	2000 (78.74)	2000 (78.74)	2000 (78.74)	2000 (78.74)	2000 (78.74)	2000 (78.74)	2000 (78.74)	2000 (78.74)	2000 (78.74)	2200 (86.61)	2200 (86.61)	2200 (86.61)	2200 (86.61)	2200 (86.61)	2400 (94.49)	2400 (94.49)	2400 (94.49)	
	Power Cell	HxWxD, mm (in.)	420x182x597 (16.53x7.16x23.5)	420x182x597 (16.53x7.16x23.5)	420x182x597 (16.53x7.16x23.5)	420x182x597 (16.53x7.16x23.5)	420x182x597 (16.53x7.16x23.5)	420x182x597 (16.53x7.16x23.5)	420x182x597 (16.53x7.16x23.5)	420x182x597 (16.53x7.16x23.5)	420x182x597 (16.53x7.16x23.5)	420x182x597 (16.53x7.16x23.5)	420x182x597 (16.53x7.16x23.5)	420x182x597 (16.53x7.16x23.5)	420x182x597 (16.53x7.16x23.5)	420x182x597 (16.53x7.16x23.5)	420x262x619 (16.53x10.31x24.37)	420x262x619 (16.53x10.31x24.37)	420x262x619 (16.53x10.31x24.37)	
	Number of Fans		3-RH40	3-RH40	3-RH40	3-RH40	3-RH40	3-RH40	4-RH40	4-RH40	4-RH40	5-RH40	5-RH40	5-RH40	5-RH40	6-RH40	6-RH40	6-RH40	6-RH40	I
	abo)		STR_1	STR_1	STR_1	STR_1	STR_1	STR_1	STR_3	STR_3	STR_3	STR_4	STR_4	STR_4	STR_4	STR_5	STR_2	STR_2	STR_2	
	Power Ce Rating	Amps	40	40	40	75	7.5	7.5	75	100	100	100	120	120	150	150	180	180	700	
	mrotznarT JdgisW	kg	1400	1500	1600	1700	1800	1900	2000	2100	2200	2350	2500	2600	2800	3000	3700	3800	3900	
19	mrotznerT gniteA	kvA	400	450	200	009	700	800	006	1000	1100	1250	1300	1500	1635	1750	2000	2250	2350	
	Typical Mo Power Rati	Ч	400	450	200	009 (700	008	006	1000	1100	1250	1300	0 1500	0 1635	0 1750	0 2000	0 2250	3 2350	
		n. kW	300	335	373	450	522	009	0/9	750	820	933	970	1120	1220	1300	1500	1680	1753	
	Motor Amps	t. 1 Min.	37	42	46	95	. 64	74	82	93	102	116	0 120	5 139	151	5 162	2 186	1 208	2 218	
		Cont.	31	35	39	47	54	62	69	78	82	16	100	J 116	126	Jj 135	155	174	182	ļ
	Catalog Number		6000U-A31DJ-AJ6J	6000U-A35DJ-AJ6J	6000U-A39DJ-AJ6J	6000U-A47DJ-AJ6J	6000U-A54DJ-AJ6J	6000U-A62DJ-AJ6J	6000U-A69DJ-AJ6J	6000U-A78DJ-AJ6J	6000U-A85DJ-AJ6J	6000U-A97DJ-AJ6J	6000U-A100DJ-AJ6J	6000U-A116DJ-AJ6J	6000U-A126DJ-AJ6J	6000U-A135DJ-AJ6Jj	6000U-A155DJ-AJ6J	6000U-A174DJ-AJ6J	6000U-A182DJ-AJ6J	

Table 41 - 6900V Input & 6000V AC Output (36 Pulse Configuration - 18 Power Cells)

														Dimer	Dimensions. mm (in.)	ım (in.)							-		W1				W2		
Catalog Number	Motor Amps	. Amps	JoM lssiqyT	Power Rati	gniteA mrotenerT	Meight	Power Cel Bating Structure	eructure ebo) Se	Number of Fans	Power Cell		Width	ŧ			Depth		<u> </u>	Height		Weight, kg (lbs)	kg (lbs)	trement	riA ls: redm rans7	-	Total Airflow		mber Fans	Total Airflow	irflow	ı
	Cont.	1 Min.	kΜ	유	kva	kg	Amps		 -	HxWxD, mm (in.)	LW1	WZa	WZb	W	10	D2	_	H1 H2	-	N H	M1 M2	Z M	Redu	nN	m ³ /s	r/s	Æ	10	m³/s L	L/s dfm	1 _
6000U-A34DK-AJ6F	34	40	300	400 4	400 1-	1400	40 SI	STR_1 3	3-RH40 (420x182x597 (16.53x7.16x23.5)	2000 (78.74) (1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 1 (2.44) (5	1362 23 (53.6) (90	2300 340 (90.55) (13.4)		2640 24 (103.94) (52	2400 192 (5280) (422	1920 4320 (4224) (9504)	20 1495.8 34)	1 2.8	-	917	1942	2 1	1.9 18	1834 3883	L۶
6000U-A38DK-AJ6F	38	45	335	450 4	450 1	1500	40 ST	STR_1 3	3-RH40 (420x182x597 (16.53x7.16x23.5)	2000 (78.74) (1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 1 (2.44) (5	1362 23 (53.6) (90	2300 340 (90.55) (13.4)		2640 25 (103.94) (55	2500 1920 (5500) (4224)	20 4420 24) (9724)	20 1682.7 24)	1 1	-	917	1942	2 1	1.9 18	1834 3883	1 ×
6000U-A42DK-AJ6F	42	50	373	200	500 1	1600	TS 57	STR_1 3	3-RH40 (420x182x597 (16.53x7.16x23.5)	2000 (78.74) (1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 1 (2.44) (5	1362 23 (53.6) (90	2300 340 (90.55) (13.4)		2640 26 (103.94) (57	2600 1920 (5720) (4224)	20 4520 24) (9944)	20 1869.7 14)	1 1.6	-	917	1942	2 1	1.9 18	1834 3883	l «
6000U-A51DK-AJ6F	51	61	450	9 009	1. 009	1700	rs 27	STR_1 3	3-RH40 (420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72) ((23.62)	4320 (170.08)	1300 (51.18)	62 1 (2.44) (5	1362 23 (53.6) (90	2300 340 (90.55) (13.4)		2640 27 (103.94) (59	2700 1920 (5940) (4224)	20 4620 24) (10164)	20 2243.6 64)	3.6	-	917	1942	2 1	81 6.1	1834 3883	Lω
6000U-A59DK-AJ6F	59	70	522	7007	700 18	1800	75 ST	STR_1 3	3-RH40 (420x182x597 (16.53x7.16x23.5)	2000 (78.74) (1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 1 (2.44) (5	1362 23 (53.6) (90	2300 340 (90.55) (13.4)		2640 28 (103.94) (61	2800 192 (6160) (422	1920 4720 (4224) (10384)	20 2617.6 84)	1 9.7	-	917	1942	2 1	1.9 18	1834 3883	1 ×
6000U-A68DK-AJ6F	89	81	009	8 008	800	1900	15 ST	STR_1 3	3-RH40 (420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	(23.62)	4320 (170.08)	1300 (51.18)	62 1 (2.44) (5	1362 23 (53.6) (90	2300 340 (90.55) (13.4)		2640 29 (103.94) (63	2900 192 (6380) (422	1920 4820 (4224) (10604)	20 2991.5 04)	1.5	-	917	1942	2 1	1.9 18	1834 3883	3
6000U-A76DK-AJ6F	92	91	0/9	006	900	2000	TO 001	STR_3 4	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74) ((17.20 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 1 (2.44) (5	1362 23 (53.6) (90	2300 340 (90.55) (13.4)		2640 30 (103.94) (66	3000 192 (6600) (422	1920 4920 (4224) (10824)	20 3365.4 24)	5.4 2	1.9	1834	3883	2 1	1.9 18	1834 3883	1 _E
6000U-A85DK-AJ6F	85	102	750	10001	1000 2	2100	100 ST	STR_3 4	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74) (1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 1 (2.44) (5	1362 23 (53.6) (90	2300 340 (90.55) (13.4)		2640 31 (103.94) (68	3100 192 (6820) (422	1920 5020 (4224) (11044)	20 3739.4 44)	9.4 2	1.9	1834	3883	2 1	1.9 18	1834 3883	1 ×
6000U-A93DK-AJ6F	93	111	820	1100	1100 2	. 0022	TO 001	STR_3 4	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74) (1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 1 (2.44) (5	1362 23 (53.6) (90	2300 340 (90.55) (13.4)		2640 32 (103.94) (70	3200 192 (7040) (422	1920 5120 (4224) (11264)	20 4113.3 64)	3.3 2	1.9	1834	3883	2 1	1.9 18	1834 3883	l տ
6000U-A100DK-AJ6F	100	120	880	1180 1	1180 2.	7300	100 ST	STR_3 4	4-RH40 (420x182x597 (16.53x7.16x23.5)	2000 (78.74)	17.20 (67.72)	(23.62)	4320 (170.08)	1300 (51.18)	62 1 (2.44) (5	1362 23 (53.6) (90	2300 340 (90.55) (13.4)		2640 33 (103.94) (72	3300 192 (7260) (422	1920 5220 (4224) (11484)	20 4412.5 84)	2.5 2	1.9	1834	3883	2 1	1.9 18	1834 3883	١٠
6000U-A106DK-AJ6F	106	127	933	1250 1	1250 2	. 5350	120 ST	STR_4 5	5-RH40 (420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4520 (177.95)	1300 (51.18)	62 1 (2.44) (5	1362 23 (53.6) (90	2300 340 (90.55) (13.4)		2640 34 (103.94) (74	3400 192 (7480) (442	1920 5320 (4424) (11704)	20 4674.2 04)	4.2 2	1.9	1834	3883	3 2	2.8 27.	2750 5824	4
6000U-A110DK-AJ6F	110	132	970	1300	1300 2	. 2200	120 ST	STR_4 5	5-RH40 (420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	(23.62)	4320 (170.08)	1300 (51.18)	62 1 (2.44) (5	1362 23 (53.6) (90	2300 340 (90.55) (13.4)		2640 35 (103.94) (78	3550 192 (7810) (422	1920 5470 (4224) (12034)	70 4861.2 34)	1.2 2	1.9	1834	3883	3 2	2.8 27	2750 5824	4
6000U-A128DK-AJ6F	128	153	1120	1500	1500 2	. 7009	TS 021	STR_4 5	5-RH40 (420x182x597 (16.53x7.16x23.5)	2200 (86.61)	17.20 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44) (5	1362 23 (53.6) (90	2300 340 (90.55) (13.4)		2640 36 (103.94) (80	3650 1920 (8030) (4224)	20 5570 24) (12254)	70 5609.1 54)	9.1 2	1.9	1834	3883	3 2	2.8 27.	2750 5824	4
6000U-A139DK-AJ6F	139	166	1220	1635 1	1635 24	7800	TS 021	STR_4 5	5-RH40 (420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 1 (2.44) (5	1362 23 (53.6) (90	2300 340 (90.55) (13.4)		2640 38 (103.94) (84	3850 192 (8470) (422	1920 5770 (4224) (12694)	70 6113.9 94)	3.9 2	1.9	1834	3883	3 2	2.8 27.	2750 5824	4
6000U-A148DK-AJ6F	148	177	1300	1750 1	1750 30	3000	150 S1	STR_5 6	6-RH40 (420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	(23.62)	4320 (170.08)	1300 (51.18)	62 1 (2.44) (5	1362 23 (53.6) (90	2300 340 (90.55) (13.4)		2640 40 (103.94) (89	4050 192 (8910) (422	1920 5970 (4224) (13134)	70 6543.9 34)	3.9	2.8	2750	5824	3 2	2.8 27.	2750 5824	4
6000U-A171DK-AJ6F	171	205	1500	2000	2000 3:	3700	180 S1	STR_2 6	6-RH40 (1	420x262x619 (16.53x10.31x24.37)	2400 (94.49) (3	2200 (86.61) ((23.62)	5200 (204.72)	1300 (51.18)	62 1 (2.44) (5	1362 23 (53.6) (90	2300 340 (90.55) (13.4)		2640 48 (103.94) (10	4800 1360 (10560) (2992)	60 6160 92) (13552)	50 7478.8 52)	3.8	2.8	2750	5824	3 2	2.8 27.	2750 5824	4
6000U-A191DK-AJ6F	191	229	1680	2250 2	2250 38	3800	Z00 S1	STR_2 6	6-RH40 (1	420x262x619 (16.53x10.31x24.37)	2400 (94.49) (3	2200 (86.61) ((23.62)	5200 (204.72)	1300 (51.18)	62 1 (2.44) (5	1362 23 (53.6) (90	2300 340 (90.55) (13.4)		2640 49 (103.94) (10	4900 1360 (10780) (2992)	60 6260 92) (13772)	8413.6 72)	3.6	2.8	2750	5824	3 2	2.8 27.	2750 5824	4
6000U-A200DK-AJ6F	200	240	1753	2350 2	2350 39	3900	Z00 S1	STR_2 6	6-RH40 (1	420x262x619 (16.53x10.31x24.37)	2400 (94.49)	2200 (86.61)	600 (23.62)	5200 (204.72)	1300 (51.18)	62 (2.44) (5	1362 23 (53.6) (90	2300 340 (90.55) (13.4)		2640 50 (103.94) (110	5000 174 (11000) (382	1740 6740 (3828) (14828)	8787.5 28)	7.5 3	2.8	2750	5824	3 2	2.8 27.	2750 5824	4
																															1

Table 42 - 6900V Input & 6300V AC Output (36 Pulse Configuration - 18 Power Cells)

		F			_	L	L								(=)				L					110					
				əш.	əш.	[[ē]	əır		1				nimen N	Dimensions, mm (in.)	(III.)	-			-				-	- -			-	7.0	
Catalog Number	Motor Amps	Amps	M IssiqyT SA 19wo9	rotznevT niteA	rotznarT IgisW	Power (obo)	of Fans	Power Cell		Width	æ		ă	Depth		Height	jht.		Weight, kg (lbs)	(sql) by	uirement Stal Air	nmber sans 1	Tota	Total Airflow	≥ umber	sne1 h	To tal Airflow	flow
	Cont. 1	1 Min.	KW H	Нр куд	kg	Amps			HxWxD, mm (in.)	W1	WZa V	W2b	Μ	11	D2	н а	н н2	H	LM I	1 M2	W		N	m³/s	r/s	J J	o m³/s	s/I s	ф
6000U-A31DK-AJ6H	31	37 2	286 38	384 400	1400	40	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74) (6.	1720 (67.72)	600 (13.62)	4320 (170.08) (5	1300 (51.18)	62 13 (2.44) (53	1362 23 (53.6) (90.	2300 340 (90.55) (13.4)) 2640 4) (103.94)	40 2400 .94) (5280)	00 1920 80) (4224)	0 4320 4) (9504)) 1495.8 t)	- 1	-	112	1942	2 1.9	1834	3883
6000U-A35DK-AJ6H	35	42 3	320 42	429 450	1500	40	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74) (6.	1720 (67.72)	600 , (13.62)	4320 (170.08) (5	1300 (51.18)	62 13 (2.44) (53	1362 23 (53.6) (90.	2300 340 (90.55) (13.4)) 2640 4) (103.94)	40 2500 .94) (5500)	00 1920 00) (4224)	0 4420 4) (9724)) 1682.7 t)	7 1	-	112	1942	2 1.9	1834	3883
6000U-A39DK-AJ6H	39	46 3	356 47	477 500	1600	40	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74) (6.	1720 (67.72) (2	600 , (23.62) (1:	4320 1 (170.08) (5	1300 (51.18) (3	62 13 (2.44) (53	1362 23 (53.6) (90.	2300 340 (90.55) (13.4)) 2640 4) (103.94)	40 2600 .94) (5720)	00 1920 20) (4224)	0 4520 4) (9944)	1869.7	7 1	-	1 216	1942	2 1.9	1834	3883
6000U-A47DK-AJ6H	47	56 4	430 57	929 929	1700	7.5	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74) (6.	1720 (67.72) (2	600 , (23.62) (1:	4320 1 (170.08) (5	1300 (51.18) (3	62 13 (2.44) (53	1362 23 (53.6) (90.	2300 340 (90.55) (13.4)) 2640 4) (103.94)	40 2700 .94) (5940)	00 1920 40) (4224)	0 4620 4) (10164)	2243.6	1 9	-	1 216	1942	2 1.9	1834	3883
6000U-A54DK-AJ6H	54	64 4	498 66	002 899	1800	7.5	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74) (6.	1720 (67.72)	600 , (13.62)	4320 1 (170.08) (5	1300 (51.18) (3	62 13 (2.44) (53	1362 23 (53.6) (90.	2300 340 (90.55) (13.4)) 2640 4) (103.94)	40 2800 .94) (6160)	00 1920 60) (4224)	0 4720 4) (10384)	2617.6	1 9	٦	1 216	1942	2 1.9	1834	3883
6000U-A62DK-AJ6H	62	74 5	573 76	992	1900	75	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74) (6.	1720 (67.72)	600 , (13.62)	4320 1 (170.08) (5	1300 (51.18)	62 13 (2.44) (53	1362 23 (53.6) (90.	2300 340 (90.55) (13.4)) 2640 4) (103.94)	40 2900 .94) (6380)	00 1920 80) (4224)	0 4820 4) (10604)	2991.5	5 1	-	116	1942	2 1.9	1834	3883
6000U-A69DK-AJ6H	69	82 6	640 85	857 900	2000	75	STR_3	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74) (6.	1720 (67.72)	600 , (23.62) (1:	4320 1 (170.08) (5	1300 (51.18)	62 13 (2.44) (53	1362 23 (53.6) (90.	2300 340 (90.55) (13.4)) 2640 4) (103.94)	40 3000 .94) (6600)	00 1920 00) (4224)	0 4920 4) (10824)	3365.4	.4 2	1.9	1834	3883	2 1.9	1834	3883
6000U-A78DK-AJ6H	78	93 7	716 96	960 1000	2100	100	STR_3	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74) (6.	1720 (67.72) (2	600 , (23.62) (1:	4320 1 (170.08) (5	1300 (51.18) (3	62 13 (2.44) (53	1362 23 (53.6) (90.	2300 340 (90.55) (13.4)) 2640 4) (103.94)	40 3100 .94) (6820)	00 1920 20) (4224)	0 5020 4) (11044)	3739.4	2	1.9	1834	3883	2 1.9	1834	3883
6000U-A85DK-AJ6H	85	102 7	783 10	1049 1100	2200	100	STR_3	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74) (67	1720 (67.72) (2	600 (23.62) (1:	4320 (170.08) (5	1300 (51.18)	62 13 (2.44) (53	1362 23 (53.6) (90.	2300 340 (90.55) (13.4)) 2640 4) (103.94)	40 3200 .94) (7040)	00 1920 40) (4224)	0 5120 4) (11264)	4113.3	3 2	1.9	1834	3883	2 1.9	1834	3883
6000U-A97DK-AJ6H	26	116 8	891 11	1194 1250	2350	100	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 1 (86.61) (6	1720 (67.72) (2	600 (23.62) (1:	4520 1 (177.95) (5	1300 (51.18)	62 13 (2.44) (53	1362 23 (53.6) (90.	2300 340 (90.55) (13.4)) 2640 4) (103.94)	40 3400 .94) (7480)	00 1920 80) (4424)	0 5320 4) (11704)	4674.2	2 2	1.9	1834	3883	3 2.8	2750	5824
6000U-A100DK-AJ6H	100	120 9	926 12	1241 1300	2500	120	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61) (6.	1720 (67.72)	600 , (23.62) (1:	4320 1 (170.08) (5	1300 (51.18) (3	62 13 (2.44) (53	1362 23 (53.6) (90.	2300 340 (90.55) (13.4)) 2640 4) (103.94)	40 3550 .94) (7810)	50 1920 10) (4224)	0 5470 4) (12034)	4861.2	2 2	1.9	1834	3883	3 2.8	2750	5824
6000U-A116DK-AJ6H	116	139 10	1069	1433 1500	7 2600	120	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61) (67	1720 (67.72)	600 (23.62) (1:	4320 (170.08) (5	1300 (51.18)	62 13 (2.44) (53	1362 23 (53.6) (90.	2300 340 (90.55) (13.4)) 2640 4) (103.94)	40 3650 .94) (8030)	50 1920 30) (4224)	0 5570 4) (12254)	5609.1	.1 2	1.9	1834	3883	3 2.8	2750	5824
6000U-A126DK-AJ6H	126	151 17	1165 15	1561 1635	7800	150	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61) (6.	1720 (67.72)	600 , (23.62)	4320 (170.08) (5	1300 (51.18)	62 13 (2.44) (53	1362 23 (53.6) (90.	2300 340 (90.55) (13.4)	2640 4) (103.94)	40 3850 .94) (8470)	50 1920 70) (4224)	0 5770 4) (12694)	6113.9	9 2	1.9	1834	3883	3 2.8	2750	5824
6000U-A135DK-AJ6H	135	162 1.	1241 16	1663 1750	3000	150	STR_5	6-RH40	420x182x597 (16.53x7.16x23.5)	2200 1 (86.61) (6	1720 (67.72)	600 , (23.62) (1:	4320 1 (170.08) (5	1300 (51.18)	62 13 (2.44) (53	1362 23 (53.6) (90.	2300 340 (90.55) (13.4)) 2640 4) (103.94)	40 4050 .94) (8910)	50 1920 10) (4224)	0 5970 4) (13134)	(6543.9 4)	6.	2.8	2750 5	5824	3 2.8	2750	5824
6000U-A155DK-AJ6H	155	186 14	1432 19	1919 2000	3700	180	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 2 (94.49) (86	2200 (86.61) (2	600 (23.62)	5200 (204.72)	1300 (51.18)	62 13 (2.44) (53	1362 23 (53.6) (90.	2300 340 (90.55) (13.4)		2640 4800 (103.94) (10560)	00 1360 (2992)	0 6160 2) (13552)	7478.8	8.	2.8	2750 5	5824	3 2.8	2750	5824
6000U-A174DK-AJ6H	174	208 16	1604 21:	2150 2250	3800	180	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 2 (94.49) (86	2200 (86.61) (2	600 (23.62)	5200 (204.72)	1300 (51.18)	62 13 (2.44) (5]	1362 23 (53.6) (90.	2300 340 (90.55) (13.4)		2640 4900 (103.94) (10780)	00 1360 (2992)	0 6260 2) (13772)) 8413.6 2)	.6 3	2.8	2750 5	5824	3 2.8	2750	5824
6000U-A182DK-AJ6H	182	218 16	1673 22	2243 2350	3900	200	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 2 (94.49) (86	2200 (86.61)	600 (23.62)	5200 (204.72) (5	1300 (51.18)	62 13 (2.44) (53	1362 23 (53.6) (90.	2300 340 (90.55) (13.4)		2640 5000 (103.94) (11000)	00 1740 100) (3828)	0 6740 8) (14828)	8787.5	5 3	2.8	2750	5824	3 2.8	2750	5824
6000U-A200DK-AJ6H	700	240 18	1852 24	2482 2600	4900	700	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 2 (94.49) (86	2200 (86.61)	600 (23.62)	5200 1 (204.72) (5	1300 (51.18) (3	62 13 (2.44) (5	1362 23 (53.6) (90.	2300 340 (90.55) (13.4)		2640 6000 (103.94) (13200)	00 1740 (3828)	8) (17028)	9722.4	.4 3	2.8	2750 5	5824	3 2.8	2750	5824

Table 43 - 6900V Input & 6600V AC Output (36 Pulse Configuration - 18 Power Cells)

Catalog Number Motor Amps 6000U-A31DK-AJ6J 31 37 6000U-A35DK-AJ6J 35 42 6000U-A39DK-AJ6J 39 46 6000U-A39DK-AJ6J 39 46 6000U-A47DK-AJ6J 47 56	2	oM lesiq swer Rat	nrotzi grite	L L L																			:		_			
Cont. 31 35 35 39 47	_			otsnast QieW	Power Co Rating	utsurte Sebol	Number of Fans	Power Cell		Width	ے ا		De	Depth		Height	þţ	>	Weight, kg (lbs)	(lbs)	tnement TiA leto	umber Fans	Tota	Total Airflow	nmber	sne11	Fotal Airflow	low
35 39 39 47		kW Hp	KVA	kg	Amps			HxWxD, mm (in.)	W	WZa V	W2b	Μ	10	D 20	H	H2	=	M1	M2	W		N	m³/s	r/s		o m³/s	s L/s	cfm
39 47	37 300	10 400	400	1400	40	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74) (67	1720 (67.72)	600 (23.62)	4320 1 (170.08) (5	1300 (51.18) (2.	62 1362 (2.44) (53.6)	52 2300 .6) (90.55)	0 340 55) (13.4)	2640 (103.94)	2400 (5280)	1920 (4224)	4320) (9504)	1495.8	-	-	1 116	1942 2	2 1.9	1834	3883
39	42 335	15 450	450	1500	40	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74) (67	1720 (67.72)	600 , (23.62) (1:	4320 (170.08) (5	1300 (51.18) (2.	62 1362 (2.44) (53.6)	52 2300 .6) (90.55)	0 340 55) (13.4)	2640 (103.94)	2500 (5500)) 1920 (4224)	(9724)	1682.7	-	-	1 216	1942 2	1.9	1834	3883
47	46 373	3 200	200	1600	40	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74) (67	1720 (67.72)	600 (23.62)	4320 1. (170.08) (5	1300 (51.18) (2.	62 1362 (2.44) (53.6)	52 2300 .6) (90.55)	0 340 55) (13.4)	2640 (103.94)	2600 (5720)) 1920 (4224)	4520 (9944)	1869.7	-	-	1 116	1942 2	2 1.9	1834	3883
	56 450	009 0:	009	1700	75	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74) (67	1720 (67.72)	600 , (13.62)	4320 1. (170.08) (5	1300 (51.18) (2.	62 1362 (2.44) (53.6)	52 2300 .6) (90.55)	0 340 55) (13.4)	2640 (103.94)	2700) 1920 (4224)	4620 (10164)	2243.6	-	-	1 216	1942 2	2 1.9	1834	3883
6000U-A54DK-AJ6J 54 6	64 522	2 700	700	1800	75	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 1: (78.74) (67	1720 (67.72)	600 , (13.62)	4320 1 (170.08) (5	1300 (51.18) (2.	62 1362 (2.44) (53.6)	52 2300 .6) (90.55)	0 340 55) (13.4)	2640 (103.94)	2800 (6160)) 1920 (4224)	4720 (10384)	2617.6	-	-	1 216	1942 2	2 1.9	1834	3883
6000U-A62DK-AJ6J 62 77	74 600	008 00	008	1900	75	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74) (67	1720 (57.72)	600 (23.62)	4320 1. (170.08) (5	1300 (51.18) (2.	62 1362 (2.44) (53.6)	52 2300 .6) (90.55)	0 340 55) (13.4)	2640 (103.94)	2900 (6380)) 1920 (4224)	4820 (10604)	2991.5	-	-	1 116	1942 2	2 1.9	1834	3883
6000U-A69DK-AJ6J 69 8	82 670	006 0.	006	2000	75	STR_3	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74) (67	1720 (67.72)	600 (23.62)	4320 1 (170.08) (5	1300 (51.18) (2.	62 1362 (2.44) (53.6)	52 2300 .6) (90.55)	0 340 55) (13.4)	2640 (103.94)	3000 (4)) 1920 (4224)	4920 (10824)	3365.4	7	1.9	1834 3	3883 2	2 1.9	1834	3883
6000U-A78DK-AJ6J 78 9	93 750	1000	0001 0	2100	100	STR_3	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74) (67	1720 (67.72)	600 , (23.62) (1:	4320 1. (170.08) (5	1300 (51.18) (2.	62 1362 (2.44) (53.6)	52 2300 .6) (90.55)	0 340 55) (13.4)	2640 (103.94)	3100 (6820)) 1920 (4224)	5020 (11044)	3739.4	7	1.9	1834 3	3883 2	2 1.9	1834	3883
6000U-A85DK-AJ6J 85 1C	102 820	1100	0 1100	2200	100	STR_3	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74) (67	1720 (67.72)	600 (23.62)	4320 1 (170.08) (5	1300 (51.18) (2.	62 1362 (2.44) (53.6)	52 2300 .6) (90.55)	0 340 55) (13.4)	2640 (103.94)	3200 (7040)) 1920 (4224)	5120 (11264)	4113.3	3 2	1.9	1834 3	3883 2	2 1.9	1834	3883
6000U-A97DK-AJ6J 97 11	116 933	1250	0 1250	2350	100	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 1; (86.61) (67	1720 (67.72)	600 (23.62)	4520 1. (177.95) (5	1300 (51.18)	62 1362 (2.44) (53.6)	52 2300 .6) (90.55)	0 340 55) (13.4)	2640 (103.94)	3400 (7480)	1920 (4424)	5320 (11704)	4674.2	2 2	1.9	1834 3	3883 3	3 2.8	2750	5824
6000U-A100DK-AJ6J 100 12	120 970	0 1300	0 1300	2500	120	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 1: (86.61) (67	1720 (67.72)	600 , (23.62) (1:	4320 1. (170.08) (5 ⁻	1300 (51.18) (2.	62 1362 (2.44) (53.6)	52 2300 .6) (90.55)	0 340 55) (13.4)	2640 (103.94)	3550 (7810)) 1920 (4224)	5470 (12034)	4861.2	2	1.9	1834 3	3883 3	3 2.8	2750	5824
6000U-A116DK-AJ6J 116 13	139 1120	1500	0 1500	2600	120	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 1: (86.61) (67	1720 (67.72)	600 (23.62)	4320 1. (170.08) (5	1300 (51.18) (2.	62 1362 (2.44) (53.6)	52 2300 .6) (90.55)	0 340 55) (13.4)	2640 (103.94)	3650 4) (8030)) 1920 (4224)	5570 (12254)	5609.1	7	1.9	1834 3	3883 3	3 2.8	2750	5824
6000U-A126DK-AJ6J 126 15	151 122	1220 1635	5 1635	2800	150	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 1: (86.61) (67	1720 (67.72)	600 (23.62) (1:	4320 (170.08) (5	1300 (51.18) (2.	62 1362 (2.44) (53.6)	52 2300 .6) (90.55)	0 340 55) (13.4)	2640 (103.94)	3850 (8470)) 1920 (4224)	5770 (12694)	6113.9	3 2	1.9	1834 3	3883 3	3 2.8	2750	5824
6000U-A135DK-AJ6Jj 135 16	162 130	1300 1750	0 1750	3000	150	STR_5	6-RH40	420x182x597 (16.53x7.16x23.5)	2200 1: (86.61) (67	1720 (67.72)	600 , (23.62) (1:	4320 1 (170.08) (5 ⁻	1300 (51.18) (2.	62 1362 (2.44) (53.6)	52 2300 .6) (90.55)	0 340 55) (13.4)	2640 (103.94)	4050 (8910)) 1920 (4224)	5970 (13134)	6543.9		2.8	2750 5	5824 3	3 2.8	2750	5824
6000U-A155DK-AJ6J 155 18	186 150	1500 2000	0 2000	3700	180	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 2: (94.49) (86	2200 (86.61)	600 (23.62)	5200 1 (204.72) (5	1300 (51.18) (2.	62 1362 (2.44) (53.6)	52 2300 .6) (90.55)	0 340 55) (13.4)	2640 (103.94)	4800 (10560)) 1360 0) (2992)	6160 (13552)	7478.8	3	2.8	2750 5	5824 3	3 2.8	2750	5824
6000U-A174DK-AJ6J 174 2C	208 168	1680 2250	0 2250	3800	180	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 2: (94.49) (86	2200 (86.61)	600 (23.62)	5200 1 (204.72) (5	1300 (51.18) (2.	62 1362 (2.44) (53.6)	52 2300 .6) (90.55)	0 340 55) (13.4)	2640 (103.94)	4900 4) (10780)) 1360 0) (2992)	(13772)	8413.6	3	2.8	2750 5	5824 3	3 2.8	2750	5824
6000U-A182DK-AJ6J 182 21	218 175	1753 2350	0 2350	3900	200	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 (94.49)	2200 (86.61)	600 (23.62)	5200 1 (204.72) (5	1300 (51.18) (2.	62 1362 (2.44) (53.6)	52 2300 .6) (90.55)	0 340 55) (13.4)	2640 (103.94)	5000 (11000)) 1740 0) (3828)	(14828)	8787.5	3	2.8	2750 5	5824 3	3 2.8	2750	5824
6000U-A200DK-AJ6J 200 24	240 194	1940 2600	0 2600	4900	700	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 2. (94.49) (86	2200 (86.61)	(23.62)	5200 1 (204.72) (5	(51.18)	62 1362 (2.44) (53.6)	52 2300 .6) (90.55)	0 340 55) (13.4)	2640 (103.94)	6000 (13200)	0) (3828)	(17028)	9722.4	e -	2.8	2750 5	5824 3	3 2.8	2750	5824

Table 44 - 2400V Input & 2300/2400V AC Output (18 Pulse Configuration - 9 Power Cells)

Motor	Amps	Typical Motor	Power Rating	Transformer Rating	Width	Depth	Height	Structure Code
Cont.	1 Min.	kW	Нр	kVA	W	D	Н	
39134	46240	137470	184629	250700	3550	1362	2680	STR_9
155200	186240	545702	730941	8001000	3790	1362	2640	STR_10

Table 45 - 4160V Input & 4000/4160V AC Output (24 Pulse Configuration - 12 Power Cells)

Motor	Amps	Typical Motor	Power Rating	Transformer Rating	Width	Depth	Height	Structure Code
Cont.	1 Min.	kW	Нр	kVA	W	D	Н	
3799	44118	225600	300800	300800	3790	1362	2640	STR_6
110145	132174	670880	9001180	9001180	3790	1362	2640	STR_7
153200	183240	9331220	12501635	12501635	4380	1362	2640	STR_8

Table 46 - 6600V Input & 6000V AC Output (36 Pulse Configuration - 18 Power Cells)

Motor	Amps	Typical Motor	Power Rating	Transformer Rating	Width	Depth	Height	Structure Code
Cont.	1 Min.	kW	Нр	kVA	W	D	Н	
34148	40177	3001300	4001750	4001750	4320	1362	2640	STR_1
171200	205240	15001753	20002350	20002350	5200	1362	2640	STR_2

Table 47 - 6600V Input & 6300V AC Output (36 Pulse Configuration - 18 Power Cells)

Motor	Amps	Typical Motor	Power Rating	Transformer Rating	Width	Depth	Height	Structure Code
Cont.	1 Min.	kW	Нр	kVA	W	D	Н	
31135	37162	2861241	3841663	4001750	4320	1362	2640	STR_1
155200	186240	14321852	19192482	20002600	5200	1362	2640	STR_2

Table 48 - 6600V Input & 6600V AC Output (36 Pulse Configuration - 18 Power Cells)

Motor	Amps	Typical Motor	Power Rating	Transformer Rating	Width	Depth	Height	Structure Code
Cont.	1 Min.	kW	Нр	kVA	W	D	Н	
31135	37162	3001300	4001750	4001750	4320	1362	2640	STR_1
155200	186240	15001940	20002600	20002600	5200	1362	2640	STR_2

Table 49 - 6900V Input & 6000V AC Output (36 Pulse Configuration - 18 Power Cells)

Motor	Amps	Typical Motor	Power Rating	Transformer Rating	Width	Depth	Height	Structure Code
Cont.	1 Min.	kW	Нр	kVA	W	D	Н	
34139	40240	3001220	4001635	4001635	4320	1362	2640	STR_1
148	177	1300	1750	1750	4520	1362	2640	STR_2
171200	205240	15001753	20002350	20002350	5200	1362	2640	STR_2

Table 50 - 6900V Input & 6300V AC Output (36 Pulse Configuration - 18 Power Cells)

Motor	Amps	Typical Motor	Power Rating	Transformer Rating	Width	Depth	Height	Structure Code
Cont.	1 Min.	kW	Нр	kVA	W	D	Н	
3185	37102	286783	3841049	4001100	4320	1362	2640	STR_1
97135	116162	8911241	11941663	12501750	4520	1362	2640	STR_4
155200	186240	14321852	19192482	20002600	5200	1362	2640	STR_2

Table 51 - 6900V Input & 6600V AC Output (36 Pulse Configuration - 18 Power Cells)

Motor	Amps	Typical Motor	Power Rating	Transformer Rating	Width	Depth	Height	Structure Code
Cont.	1 Min.	kW	Нр	kVA	W	D	Н	
3185	37102	300820	4001100	4001100	4320	1362	2640	STR_1
97135	116162	9331300	12501750	12501750	4520	1362	2640	STR_4
155200	186240	1500.1940	20002600	20002600	5200	1362	2640	STR_2

Notes:

PowerFlex 6000 Bypass Cabinet Dimensions and Weights (For IEC only)

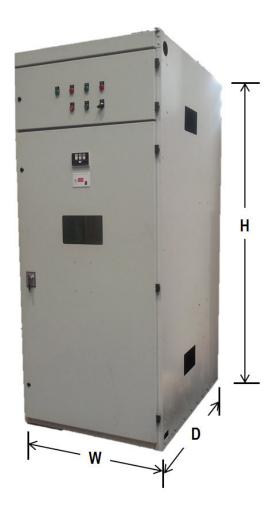


Table 52 - 3000V AC Input — PowerFlex 6012DB bypass cabinets

AAA Output Amps Typical Motor Power Rating	Typical Motor	Power Rating	Aı	Automatic Bypa	omatic Bypass – Version 1	1	Aı	Automatic Bypass – Version 2	ass – Version	2		Manual	Manual Bypass	
Cont Banga	kW Range	W Range Hn Bange	Dir	Dimensions (mm)	(۱	Weight	ΙΙ	Dimensions (mm)	u)	Weight	iiO	Dimensions (mm)	u)	Weight
agine manage	of many	agimmi din	Width	Depth	Height	(kg)	Width	Depth	Height	(kg)	Width	Depth	Height	(kg)
80200	315800 4221072	4221072	800	1300	2400	250	006	1300	2400	720	006	1300	2400	200
201380	8011600	8011600 10732144	800	1300	2400	250	006	1300	2400	720	006	1300	2400	200

Table 53 - 3300V AC Input — PowerFlex 6012DB bypass cabinets

<u>A A A</u> Output Amps Typical Motor Power Rating	Typical Motor	Power Rating	Ā	utomatic Byp.	Automatic Bypass – Version 1		Ā	stomatic Byp	lutomatic Bypass – Version 2	7		Manual Bypass	Bypass	
Cont Pange	bW Bando	W Panga Hn Panga	Δ	Dimensions (mm)	(u	Weight	Ō	Dimensions (mm)	(m	Weight	ij	Dimensions (mm)	(u	Weight
cont. nampe	of many	a film dir	Width	Depth	Height	(kg)	Width	Depth	Height	(kg)	Width	Depth	Height	(kg)
80200	315800	315800 4221072	800	1300	2400	550	006	1300	2400	720	006	1300	2400	250
201380	8011600	3011600 10732144	800	1300	2400	550	006	1300	2400	720	006	1300	2400	220

Table 54 - 6000V AC Input — PowerFlex 6012DB bypass cabinets

<u>AAA</u> Output Amps Typical Motor Power Rating	r Power Rating	Ā	Automatic Bypa	omatic Bypass – Version ´	1	Ā	Automatic Bypass – Version	ass – Version	2		Manual	Aanual Bypass	
kW Range	Hn Range	ق	Dimensions (mm)	(u	Weight	Ō	Jimensions (mm)	(E	Weight	ă	Dimensions (mm)	(u	Weight
,		Width	Depth	Height	(kg)	Width	Depth	Height	(kg)	Width	Depth	Height	(kg)
2001600	2682144	800	1300	2400	550	006	1300	2400	720	006	1300	2400	550
16013450	16013450 21454624	800	1300	2400	550	006	1300	2400	720	006	1300	2400	550

Table 55 - 6600V AC Input — PowerFlex 6012DB bypass cabinets

AAA Output Amps Typical Motor Power Rating	Typical Motor	Power Rating	Ā	Automatic Bypass – Version	ass – Version	1	А	utomatic Byp.	Automatic Bypass – Version 2	2		Manual Bypass	Bypass	
Cont Dance	Dance W.	Un Dance	IO	Dimensions (mm)	(u	Weight	IO	Jimensions (mm)	n)	Weight	Dii	Dimensions (mm)	(u	Weight
Collit, nalige	NW hallye	nw naliye iip naliye	Width	Depth	Height	(kg)	Width	Depth	Height	(kg)	Width	Depth	Height	(kg)
25200	2001600	2001600 2682144	800	1300	2400	550	006	1300	2400	720	006	1300	2400	550
201420	16013450	16013450 21454624	800	1300	2400	550	006	1300	2400	720	006	1300	2400	550

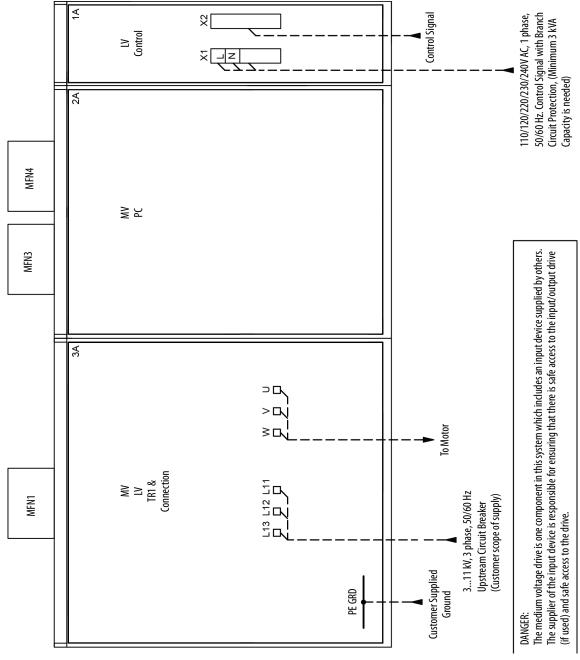
Table 56 - 10,000V AC Input — PowerFlex 6012DB bypass cabinets

AAA Output Amps Typical Motor Power Rating	Typical Motor	Power Rating	A	Automatic Bypa	omatic Bypass – Version 1	1	A	utomatic Bypass – Version 2	ass – Version	2		Manual Bypass	Bypass	
Cont Range	kW Range	kW Range Hn Range	οii	imensions (mm)	(L	Weight	οii	Dimensions (mm)	(L	Weight	IIO	Jimensions (mm	(u	Weight
, fi	- A	7	Width	Depth	Height	(kg)	Width	Depth	Height	(kg)	Width	Depth	Height	(kg)
15200	2002800	2002800 2683753	800	1300	2400	250	006	1300	2400	720	006	1300	2400	250
201420	28015600	28015600 37547506	800	1300	2400	250	006	1300	2400	720	006	1300	2400	250

Power Cabling and Control Signal Wiring Details (For IEC)

Schematic Diagrams

Figure 83 - Schematic Diagram of the Drive System without a Bypass Cabinet⁽¹⁾

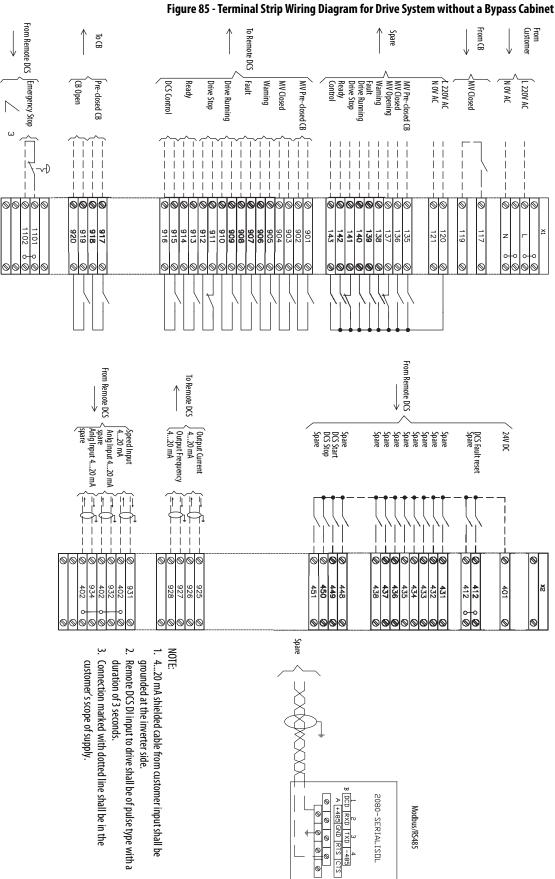


(1) Wiring locations are for design reference only; actual wiring must comply with the drawings provided with the drive.

110/120/220/230/240V AC, 1 phase, 50/60 Hz. Control Signal with Branch Circuit Protection (Minimum 3 kVA Capacity is needed) χ2 LV Control Control Signal **Z** MFN4 \mathbb{R} MFN3 The medium voltage drive is one component in this system which includes an input device supplied by others. The supplier of the input device is responsible for ensuring that there is safe access to the input/output drive (if used) and safe access to the drive. MV LV TR1 & Connection MFN1 Supplied Ground 3...11 kV, 3 phase, 50/60 Hz, Upstream Circuit Breaker (Customer scope of supply) Bypass Connection To Motor 75 DANGER:

Figure 84 - Schematic Diagram of the Drive System with a Bypass Cabinet $^{(1)}$

(1) Wiring locations are for design reference only; actual wiring must comply with the drawings provided with the drive.



From Remote DCS To Remote DCS From CB L 220V AC N OV AC N OV AC CB Open L 220V AC Warning MV Pre-closed CB Bypass Choice MV Closed Pre-dosed CB DCS Control 120 From Remote DCS From Remote DCS To Remote DCS Speed Input 4...20 mA Anlg Input 4...20 mA spare Anlg Input 4...20 mA spare Output Current 4...20 mA Output Frequency 4...20 mA Drive to Bypass Bypass to Drive Drive Choice Bypass Choice Spare DCS Start DCS Stop Spare DCS Fault reset Spare Spare Spare Spare Spare Spare Spare Spare Spare 24V DC DCD | RXD | TXD | -485 A | +485 | GND | RTS | CTS 2080-SERIALISOL Modbus/RS485 1. 4...20 mA shielded cable from customer input shall be Connection marked with dotted line shall be in the Remote DCS DI input to drive shall be of pulse type with a customer's scope of supply. grounded at the inverter side. duration of 3 seconds. QS1NC QS2NO QS1NO KM1NC KM3NO KM2NO KM1NO KM2NC

Figure 86 - Typical Terminal Strip Wiring Diagram Drive System with a Bypass Cabinet

Standard Input/Output Connection Points

Table 57 - I/O Connections related to High Voltage Cabinet

Serial Number	Name of I/O Connection	Al	AO	DI	DO	Note
1	Input circuit breaker closing node is allowed (917, 918)				1	Serially connected into the input circuit breaker's closing circuit (the VFD provides passive normally open points, valid when closed)
2	Trip connection points within the VFD (919, 920)				1	Can be connected into input circuit breaker's closing circuit in parallel (the VFD provides passive normally open points, valid when closed)
3	Input circuit breaker already closed connection point (117, 119)			1		Circuit breaker's auxiliary normally open connection points (valid when closed)

Table 58 - I/O Connections related to Remote Distributed Control System

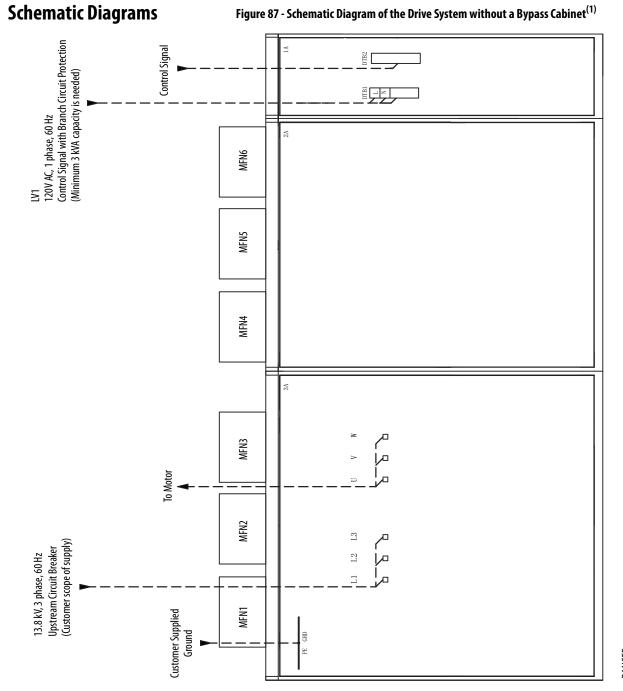
Serial Number	Name of I/O Connection	Al	AO	DI	DO	Note
1	VFD speed regulation command (931, 402)	1				User-provided 420mA
	Spare (932, 402)	1				User-provided 420 mA (spare)
	Spare (934, 402)	1				User-provided 420 mA (spare)
	Spare	1				User-provided 420 mA (spare)
2	VFD speed feedback signal (927, 928)		1			VFD-provided 420mA
3	VFD current feedback signal (925, 926)		1			VFD-provided 420mA
4	Alternate start command signal (431, 401)			1		User-provided normally open passive dry contact (pulsed quantity, valid with 3S)
	Remote DCS start command signal (449, 401)			1		User-provided normally open passive dry contact (pulsed quantity, valid with 3S)
5	Alternate stop command signal (432, 401)			1		User-provided normally open passive dry contact (pulsed quantity, valid with 3S)
	Remote DCS stop command signal (450, 401)			1		User-provided normally open passive dry contact (pulsed quantity, valid with 3S)
6	Spare (433, 401)			1		User-provided normally open passive dry contact (pulsed quantity, valid with 3S)
7	Spare (434, 401)			1		User-provided normally open passive dry contact (pulsed quantity, valid with 3S)
8	Spare (435, 401)			1		User-provided normally open passive dry contact (switch quantity)
	Spare (436, 401)			1		User-provided normally open passive dry contact (switch quantity)
	Spare (437, 401)			1		User-provided normally open passive dry contact (switch quantity)
	Spare (438, 401)			1		User-provided normally open passive dry contact (switch quantity)
9	Remote DCS alternate (448, 401)			1		User-provided normally open passive dry contact (switch quantity)
10	Remote DCS fault reset command (412, 401)			1		User-provided normally open passive dry contact (pulsed quantity, valid with 3S)
	Alternate reset command (412, 401)			1		User-provided normally open passive dry contact (pulsed quantity, valid with 3S)
11	Emergency stop button command (1101, 1102)			1		User-provided normally closed passive dry contact (voltage class higher than 220V AC, 5 A, switch quantity)
12	VFD allow closing indication (901, 902)				1	VFD-provided normally open passive dry contact (voltage class ≤220V AC, 5 A) (used for Remote DCS)
	Circuit breaker closing indication (903, 904)				1	VFD-provided normally open passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)

Table 58 - I/O Connections related to Remote Distributed Control System (Continued)

Serial Number	Name of I/O Connection	Al	AO	DI	DO	Note
	VFD alarm indication (905, 906)				1	VFD-provided normally open passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	VFD fault indication (907, 908)				1	VFD-provided normally open passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	VFD operation indication (909, 910)				1	VFD-provided normally open passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	VFD stop indication (911, 912)				1	VFD-provided normally closed passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	VFD ready indication (913, 914)				1	VFD-provided normally closed passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	Remote DCS control indication (915, 916)				1	VFD-provided normally closed passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
13	VFD allow closing indication (135, 121)				1	VFD-provided normally closed active dry contact (voltage class ≤220V AC, 5A) (spare)
	Input circuit breaker closing indication (136, 121)				1	VFD-provided normally closed active dry contact (voltage class ≤220V AC, 5A) (spare)
	Input circuit breaker opening indication (137, 121)				1	VFD-provided normally closed active dry contact (voltage class ≤220V AC, 5A) (spare)
	VFD alarm indication (138, 121)				1	VFD-provided normally open active dry contact (voltage class ≤220V AC, 5A) (spare)
	VFD fault indication (139, 121)				1	VFD-provided normally open active dry contact (voltage class ≤220V AC, 5A) (spare)
	VFD operation indication (140, 121)				1	VFD-provided normally open active dry contact (voltage class ≤220V AC, 5A) (spare)
	VFD stop indication (141, 121)				1	VFD-provided normally open active dry contact (voltage class ≤220V AC, 5A) (spare)
	VFD ready indication (142, 121)				1	VFD-provided normally open active dry contact (voltage class ≤220V AC, 5A) (spare)
	Spare (143, 121)				1	VFD-provided normally open active dry contact (voltage class ≤220V AC, 5A) (spare)
	Spare (120, 121)				1	VFD-provided 220V AC (load ≤10 W, spare)

All of the AI/AO, DI/DO connection points are expandable based on user requirements.

Power Cabling and Control Signal Wiring Details (For UL)



The medium voltage drive is one component in this system which includes an input device supplied by others. The supplier of the input device is responsible for ensuring that there is safe access to the input/output drive (if used) and safe access to the drive.

(1) Wiring locations are for design reference only; actual wiring must comply with the drawings provided with the drive.

MODBUS / RS485 2080-SERIALISOI 1. 4...20 mA shielded cable from customer input shall be grounded at the inverter side. 2. Remote DI input to drive shall be of pulse type with a duration of three seconds. 3. Connection marked with dotted line shall be in the customer's scope of supply. Connection marked with dotted line shall be in the customer's scope of supply. † † 扌 1 \perp I + I + I<u>ji ji ji ji</u> Current Output 4...20 mA Frequency Output 4...20 mA Analog Input 4...20 mA (Spare) Analog Input 4...20 mA (Spare) Remote Fault Reset Spare Remote Start Remote Stop Spare Speed Input 4...20 mA +24V DC pare Spare Spare Spare Spare Spare To Remote From Remote From Remote 1 Ϊİ İ CB Open (NC) (SPARE) MV Close (NO) (Spare) MV Pre-Closed CB MV Pre-Closed CB Pre-Closed CB (NoO) Pre-Closed CB (NC) (Spare) **Emergency Stop** Remote Control Remote Control **Drive Running Drive Running** CB Open (NO) MV Closed MV Closed **Drive Stop** MV Closed **Drive Stop** L 120V AC Waming Waming N OV AC Ready Ready Fault Fault To Customer
Vacuum Contactor
(Spare) From Remote To Remote (Spare) To Remote From Customer From CB 10 GB

Figure 88 - Terminal Strip Wiring Diagram for Drive System without a Bypass Cabinet

Standard Input/Output Connection Points

Table 59 - I/O Connections related to High Voltage Cabinet

Serial Number	Name of I/O Connection	AI	AO	DI	DO	Note
1	Input circuit breaker closing node is allowed (917, 918)				1	Serially connected into the input circuit breaker's closing circuit (the VFD provides passive normally open points, valid when closed)
	Input circuit breaker closing node is allowed (957, 958) (spare)				1	Serially connected into the input circuit breaker's closing circuit (the VFD provides passive normally open points, valid when closed)
2	Trip connection points within the VFD (919, 920)				1	Can be connected into input circuit breaker's closing circuit in parallel (the VFD provides passive normally open points, valid when closed)
	Trip connection points within the VFD (959, 960) (spare)				1	Can be connected into input circuit breaker's closing circuit in parallel (the VFD provides passive normally open points, valid when closed)
3	Input circuit breaker already closed connection point (117, 119)			1		Circuit breaker's auxiliary normally open connection points (valid when closed)
4	Input vacuum contactor closing (961, 962) (spare)				1	Serially connected into the vacuum contactor closing (the VFD provides passive normally open points, valid when closed)

Table 60 - I/O Connections related to Remote Distributed Control System

Serial Number	Name of I/O Connection	Al	AO	DI	DO	Note
1	VFD speed regulation command (931, 402)	1				User-provided 420mA
	Spare (932, 402)	1				User-provided 420 mA (spare)
	Spare (934, 402)	1				User-provided 420 mA (spare)
2	VFD speed feedback signal (927, 928)		1			VFD-provided 420mA
3	VFD current feedback signal (925, 926)		1			VFD-provided 420mA
4	Alternate start command signal (431, 401) (spare)			1		User-provided normally open passive dry contact (pulsed quantity, valid with 3S)
	Remote DCS start command signal (449, 401)			1		User-provided normally open passive dry contact (pulsed quantity, valid with 3S)
	Alternate command signal (432, 401) (spare)			1		User-provided normally open passive dry contact (pulsed quantity, valid with 3S)
5	Remote DCS stop command signal (450, 401)			1		User-provided normally closed passive dry contact (pulsed quantity, valid with 3S)
6	Spare (433, 401)			1		User-provided normally open passive dry contact (pulsed quantity, valid with 3S)
7	Spare (434, 401)			1		User-provided normally open passive dry contact (pulsed quantity, valid with 3S)
8	Spare (435, 401)			1		User-provided normally open passive dry contact (switch quantity)
	Spare (436, 401)			1		User-provided normally open passive dry contact (switch quantity)
	Spare (437, 401)			1		User-provided normally open passive dry contact (switch quantity)
	Spare (438, 401)			1		User-provided normally open passive dry contact (switch quantity)
9	Remote DCS alternate (448, 401)			1		User-provided normally open passive dry contact (switch quantity)
10	Remote DCS fault reset command (412, 401)			1		User-provided normally open passive dry contact
	Alternate reset command (412, 401)			1		User-provided normally open passive dry contact
11	Emergency stop button command (1101, 1102)			1		User-provided normally closed passive dry contact (voltage class higher than 220V AC, 5 A, switch quantity)

Table 60 - I/O Connections related to Remote Distributed Control System (Continued)

Serial Number	Name of I/O Connection	AI	AO	DI	DO	Note
	Emergency stop button command (1103, 1104)			1		User-provided normally closed passive dry contact (voltage class higher than 220V AC, 5 A, switch quantity)
12	VFD allow closing indication (901, 902)				1	VFD-provided normally open passive dry contact (voltage class ≤220V AC, 5 A) (used for Remote DCS)
	Circuit breaker closing indication (903, 904)				1	VFD-provided normally open passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	VFD alarm indication (905, 906)				1	VFD-provided normally open passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	VFD fault indication (907, 908)				1	VFD-provided normally open passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	VFD operation indication (909, 910)				1	VFD-provided normally open passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	VFD stop indication (911, 912)				1	VFD-provided normally closed passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	VFD ready indication (913, 914)				1	VFD-provided normally open passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	Remote control indication (915, 916)				1	VFD-provided normally open passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
13	VFD allow closing indication (941, 941A)				1	VFD-provided normally closed passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	Circuit breaker closing indication (942, 942A)				1	VFD-provided normally closed passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	VFD alarm indication (943, 943A)				1	VFD-provided normally closed passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	VFD fault indication (944, 944A)				1	VFD-provided normally closed passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	VFD operation indication (945, 945A)				1	VFD-provided normally closed passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	VFD stop indication (946, 946A)				1	VFD-provided normally open passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	VFD ready indication (947, 947A)				1	VFD-provided normally closed passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	Remote control indication (948, 948A)				1	VFD-provided normally closed passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)

Line and Load Cable Sizes

The data in the following tables are informative only; do not base final design criteria solely on this data. Follow national and local installation codes, industry best practices, and cable manufacturer recommendations. As cabling methods can very widely, maximum cables sizes do not account for the size of the conduit hub.

Table 61 - Line and Load Cable Sizes for IEC

	Description (Motor V/Freq.)	Drive Enclosure Opening mm (in.)	Max. Size & No. Incoming Cables: IEC ^{(1) (2) (3)}
Maximum Line	3000 V, 50/60 Hz	110 (4.33)	300 mm ² 5 kV or 240 mm ² 8 kV/phase
Cable Sizes	3300 V, 50/60 Hz	110 (4.33)	300 mm ² 5 kV or 240 mm ² 8 kV/phase
	6000 V, 50/60 Hz	110 (4.33)	240 mm ² 8 kV or 185mm ² 15 kV/phase
	6600 V, 50/60 Hz	110 (4.33)	240 mm ² 8 kV or 185mm ² 15 kV/phase
	10,000 V, 50/60 Hz	110 (4.33)	185 mm² 15 kV/phase
Maximum Load Cable Sizes	3000 V, 50/60 Hz	110 (4.33)	300 mm ² 5 kV or 240 mm ² 8 kV/phase
Capie Sizes	3300 V, 50/60 Hz	110 (4.33)	300 mm ² 5 kV or 240 mm ² 8 kV/phase
	6000 V, 50/60 Hz	110 (4.33)	240 mm ² 8 kV or 185mm ² 15 kV/phase
	6600 V, 50/60 Hz	110 (4.33)	240 mm ² 8 kV or 185mm ² 15 kV/phase
	10,000 V, 50/60 Hz	110 (4.33)	185 mm² 15 kV/phase

⁽¹⁾ Cable sizes are based on overall dimensions of compact-stranded three-conductor shielded cable (common for industrial cable tray installations). Maximum sizing stated accounts for minimum rated cable insulation requirements and the next higher-rated cable (i.e., 8 kV is not commercially available in many areas of the world, therefore Rockwell Automation provides an 8 kV (minimum rating) as well as a 15 kV rating, when applicable. Enclosure openings will accommodate the thicker insulation on the higher-rated cable. IEC ratings show the equivalent to the NEMA sizes. The exact cable mm² size shown is not commercially available in many cases; use the next smaller standard size.

⁽²⁾ Minimum cable bend radius recommendations vary by national codes, cable type, and cable size. Consult local codes for guidelines and requirements. General relationship of cable diameter to bend radius is typically between 7x...12x (e.g., if the cable diameter is 1 in. [2.54 cm] the minimum bend radius could range between 7...12 in. [18.8...30.48 cm]).

⁽³⁾ As cabling methods can vary widely, maximum cable sizes shown do not account for the size of the conduit hub. Verify size of conduit hub(s) against the "Drive enclosure openings" shown.

Table 62 - Line and Load Cable Sizes for UL

	Description (Motor V/Freq.)	Drive Enclosure Opening mm (in.)	Max. Size & No. Incoming Cables: UL ^{(1) (2) (3)}
Maximum Line Cable Sizes	2300/2400 V, 50/60 Hz	1150 x 200 (45.3 x 7.9)	300 mm ² (600 AWG) 5 kV or 240 mm ² (500 AWG) 8 kV/phase
	4000/4160 V, 50/60 Hz	1150 x 200 (45.3 x 7.9)	300 mm² (600 AWG) 5 kV or 240 mm² (500 AWG) 8 kV/phase
	6000 V, 50/60 Hz	1150 x 200 (45.3 x 7.9)	240 mm² (500 AWG) 8 kV or 185 mm² (350 AWG)15 kV/phase
	6300 V, 50/60 Hz	1150 x 200 (45.3 x 7.9)	240 mm² (500 AWG) 8 kV or 185 mm² (350 AWG)15 kV/phase
	6600 V, 50/60 Hz	1150 x 200 (45.3 x 7.9)	240 mm² (500 AWG) 8 kV or 185 mm² (350 AWG)15 kV/phase
Maximum Load Cable Sizes	2300/2400 V, 50/60 Hz	1150 x 200 (45.3 x 7.9)	300 mm² (600 AWG) 5 kV or 240 mm² (500 AWG) 8 kV/phase
	4000/4160 V, 50/60 Hz	1150 x 200 (45.3 x 7.9)	300 mm ² (600 AWG) 5 kV or 240 mm ² (500 AWG) 8 kV/phase
	6000 V, 50/60 Hz	1150 x 200 (45.3 x 7.9)	240 mm² (500 AWG) 8 kV or 185 mm² (350 AWG)15 kV/phase
	6300 V, 50/60 Hz	1150 x 200 (45.3 x 7.9)	240 mm² (500 AWG) 8 kV or 185 mm² (350 AWG)15 kV/phase
	6600 V, 50/60 Hz	1150 x 200 (45.3 x 7.9)	240 mm² (500 AWG) 8 kV or 185 mm² (350 AWG)15 kV/phase

⁽¹⁾ Cable sizes are based on overall dimensions of compact-stranded three-conductor shielded cable (common for industrial cable tray installations). Maximum sizing stated accounts for minimum rated cable insulation requirements and the next higher-rated cable (i.e., 8 kV is not commercially available in many areas of the world, therefore Rockwell Automation provides an 8 kV (minimum rating) as well as a 15 kV rating, when applicable. Enclosure openings will accommodate the thicker insulation on the higher-rated cable. IEC ratings show the equivalent to the NEMA sizes. The exact cable mm² size shown is not commercially available in many cases; use the next smaller standard size.

⁽²⁾ Minimum cable bend radius recommendations vary by national codes, cable type, and cable size. Consult local codes for guidelines and requirements. General relationship of cable diameter to bend radius is typically between 7x...12x (e.g., if the cable diameter is 1 in. [2.54 cm] the minimum bend radius could range between 7...12 in. [18.8...30.48 cm]).

⁽³⁾ As cabling methods can vary widely, maximum cable sizes shown do not account for the size of the conduit hub. Verify size of conduit hub(s) against the "Drive enclosure openings" shown.

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